

**United States Department of Energy**  
**Laboratory, Plant or Site Directed Research and Development Report**  
**Project List -- Fiscal Year 2012**

Project ID	Project Name	FY Total
<b>ANL - Argonne National Lab</b>		
P/ANL2010-003	Magneto-Vibrational Energy Conversion at the Nanoscale	\$134,100
P/ANL2010-010	Laser Manipulation of Nuclear Spin Embedded in Nobel-Gas Ice	\$148,700
P/ANL2010-029	Single Quantum Flux Magnetometer	\$151,400
P/ANL2010-042	Emerging Technologies for Scientific Databases	\$149,100
P/ANL2010-043	Low Mass Optical Read-out for High Data Bandwidth Systems	\$176,500
P/ANL2010-044	Novel Power System Operations Methods for Wind-powered Plug-in Hybrid Electric Vehicles	\$493,200
P/ANL2010-049	Compact Solid-state Sources of Coherent THz-radiation	\$133,500
P/ANL2010-050	Highly Efficient SERS-active Substrate with Designer Hot-spots and Multiple-stage Light Amplification	\$157,400
P/ANL2010-063	Tactile MEMS-based Sensor	\$78,100
P/ANL2010-073	Polymerized Ionic Liquid Nanostructures for Biocatalytic Production	\$134,100
P/ANL2010-074	Combined Approaches Towards a Hierarchical Understanding of Battery Materials	\$247,600
P/ANL2010-093	Molecular Characterization of Spore Coat Proteins	\$114,100
P/ANL2010-117	Development of Picosecond X-ray Pulses at the APS using MEMS-based X-ray Optics	\$338,000
P/ANL2010-119	Development of a High Throughput Approach to Soil Physical and Chemical Characterization in Tandem with Soil Metagenome Analysis	\$148,500
P/ANL2010-129	Layered Oxides for Thermoelectric Energy Conversion	\$110,100
P/ANL2010-131	Accelerating the MG-RAST Metagenomics Pipeline	\$397,100
P/ANL2010-137	Novel Bifunctional Low-Temperature Catalysts at the Sub-nanometer Scale	\$158,100
P/ANL2010-138	Trapped Field Magnets: A Paradigm Shift for Applications of High-field Magnets at a Synchrotron	\$114,700
P/ANL2010-139	High-throughput Reconstruction of Metabolic Models for Organisms with Applications in Energy, Bioremediation, and Carbon Sequestration	\$195,900
P/ANL2010-158	Converting CO <sub>2</sub> to Fuel through Functionalized MOFs	\$184,700
P/ANL2010-161	The Biochemistry of Plant-fungal Symbiotic Relationships	\$173,000
P/ANL2010-167	Probing Catalytic Transient Intermediate in Ultrafast Time Domain	\$348,800

P/ANL2010-183	X-ray Nanoimaging for Life Sciences	\$157,800
P/ANL2010-185	Beyond Li-ion Battery Technology for Energy Storage	\$2,007,800
P/ANL2010-188	Nanoscale Architectures for Energy Storage	\$500,100
P/ANL2010-190	Investigaton of Novel Relativistic Quantum States in Iridates	\$328,800
P/ANL2010-191	Process Engineering Research for Scalable Energy Storage Materials	\$194,500
P/ANL2010-192	Microscopic Building Blocks of a Better Lithium-ion Battery	\$67,600
P/ANL2010-193	Real-life Imaging: Before and After the Microscope	\$218,900
P/ANL2010-194	Acceleration of Cloud Microphysical Retrievals for Climate Models	\$235,600
P/ANL2010-195	Simultaneous Ecological Assessment and Characterization of Novel Proteins from a Soil Microbial Community	\$555,800
P/ANL2010-196	Atomistically-Informed Mesoscale Simulation of Gradient Nuclear-Fuel Microstructure	\$488,500
P/ANL2010-197	Controlled Heterogeneity of Materials for Energy Applications	\$608,600
P/ANL2010-198	Molecular and Fluidic Transport in Nanostructured Soft Materials and Composites	\$413,200
P/ANL2010-199	Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era	\$297,900
P/ANL2010-201	Near-Term Spent Nuclear Fuel Disposal Using Accelerator Drive System	\$328,800
P/ANL2010-202	The Rational Synthesis of Kinetically Stabilized, Higher Order Inorganic Materials for Catalysis	\$101,300
P/ANL2010-204	Spin and Charge Dynamics in Oxide Heterostructures	\$456,900
P/ANL2011-005	Tunnel-Diode Oscillator Detection Technique for Ultrasensitive Magnetometry and Resistivity Measurements of Microscopic Samples	\$139,600
P/ANL2011-012	Synthesis, Characterization and Properties of Fast Acting Amorphous Drugs	\$112,700
P/ANL2011-022	From Plastic Bags to High-performance Lubrication Additives: A Green Chemistry Solution to Energy Efficiency and Environmental Challenges in Transportation	\$183,100
P/ANL2011-023	Tuning Electronic Structure at High Pressures: Towards Novel Materials Discovery from X-ray Science Under Extreme Conditions	\$259,800
P/ANL2011-027	Data Encryption and Compression for Cybersecurity Applications	\$123,600
P/ANL2011-038	Runtime Support for Integrating MPI and Accelerator Programming Models for Exascale Systems	\$201,800

P/ANL2011-052	Toward Understanding Cloud Processes and Uncertainty Modeling in Next-Generation High-Resolution Climate Models	\$251,700
P/ANL2011-060	Soft Catalysts for Green Chemistry and Energy Applications	\$665,400
P/ANL2011-063	Development of In Situ Radioactive Materials Probes using High-energy X-rays	\$315,600
P/ANL2011-067	Fast X-Ray Detectors Based on Multichannel Plates	\$164,900
P/ANL2011-071	Achieving Efficient Thermal Energy Transport with One-dimensional Polymer Nanofibres	\$132,400
P/ANL2011-083	Guided Discovery of Crystalline Molecular Materials for Advanced Energy, Information and Communication Technologies	\$360,700
P/ANL2011-093	New Technologies for Label-free Antibody-based Multiplexed Biosensors	\$94,100
P/ANL2011-097	Dynamics of Spin-polarized Carriers in New Spin Electronic Materials and Devices	\$120,800
P/ANL2011-101	Reactive Synthesis of Metastable Materials	\$507,700
P/ANL2011-104	High-performance X-ray Optics Fabrication Using Self-assembled Nanostructures	\$163,300
P/ANL2011-106	Exascale Data Analysis for Multiphysics Computational Science	\$206,000
P/ANL2011-109	Architectures and Algorithms for Protecting Sensitive Information in Mobile Wireless and Sensing Environments	\$123,200
P/ANL2011-110	Development of a Design Concept for a Ring Imaging Cherenkov Detector	\$114,400
P/ANL2011-116	Synthesis of New Sodium Layered Oxide Cathode Materials for Ambient Temperature Sodium Batteries	\$103,700
P/ANL2011-121	Multilevel Optimization Tools for the Simulation, Detection, and Mitigation of Cyber Attacks	\$123,100
P/ANL2011-123	Next Generation Multicomponent Nanocatalysts: in situ Study of the Growth and Function	\$273,100
P/ANL2011-126	Development of Software Infrastructure for the Simulation of Microbial Communities on HPC Architectures	\$234,200
P/ANL2011-129	Evaluation of Microtopography Effects on the Terrestrial Biosphere and Hydrosphere Under Regional Climate Change	\$84,600
P/ANL2011-134	Inorganic Synthons: Toward Scalable Materials Design, Discovery, and Creation	\$568,200
P/ANL2011-140	Detailed and Reduced Chemical Kinetics of Green Fuels for Compression Ignition Engine Modeling	\$218,500

P/ANL2011-147	Magnetomechanical Actuation of Membrane Channels and Cellular Signaling via Direct Energy Transfer	\$230,700
P/ANL2011-149	Next Generation Data Exploration: Intelligence in Data Analysis, Visualization and Mining	\$259,100
P/ANL2011-153	Development of Wireless Data and Power Techniques for Large Instrumentation Systems	\$226,500
P/ANL2011-170	Development of Grating Interferometers for Quantitative High-energy X-ray Imaging and for Real-time Wavefront Monitoring	\$215,200
P/ANL2011-188	Synthesis Science of Functional Layered Complex Oxides	\$602,000
P/ANL2011-193	Ultra-small Nanoparticles: A New Opportunity for Discovery of Catalytic Materials for Energy	\$191,800
P/ANL2011-196	Will Linking Ultra-large-scale Metagenomics with Models Representing Biogeochemical Cycling Improve Existing Carbon Flux Models?	\$164,600
P/ANL2011-197	Multiscale Computational Molecular Science	\$242,000
P/ANL2011-198	Fundamental Developments in Theory and Modeling of Nanoscale Systems and Phenomena	\$172,600
P/ANL2011-199	Image Furnace Growth of Single Crystals	\$148,400
P/ANL2011-200	Novel Materials for Active Nanostructures	\$297,400
P/ANL2011-202	Multifunctional Polymers for Regulating Membrane Function	\$150,400
P/ANL2011-204	Development of Revolver Undulator for APS	\$722,000
P/ANL2011-206	High-Power RF Dampers for Superconducting RF Deflecting Cavities	\$324,800
P/ANL2011-207	Device Engineering for High-Performance Photocathodes	\$153,900
P/ANL2011-209	Rare Earth Elements	\$403,400
P/ANL2011-210	Improved Catalytic Performance by Applying Electrochemical Control	\$146,500
P/ANL2011-211	Beyond-petascale Monte Carlo Methods for Practical Nuclear Reactor Analyses	\$194,400
P/ANL2011-212	Research and Development of Advanced Energy Storage Methodologies	\$389,900
P/ANL2011-213	Towards the Exascale Sky	\$1,023,600
P/ANL2011-214	Mobile Device Vulnerability Research	\$477,800
P/ANL2011-215	Studies of Thermomechanically Induced Fatigue in Glidcop for Use In Photon Absorbers for High Power Density X-ray Beam Applications	\$326,600
P/ANL2011-216	High-Performance Computation: Developing and Testing a 3-D Regional Scale Climate Model in the Ganges Valley, India	\$84,000
P/ANL2011-217	Polyelectrolyte Brushes in Multi-Valent Ionic Media	\$334,400

P/ANL2012-012	New High Energy Rechargeable Li Batteries Based On Selenium and Selenium-sulfur Composite (SexSy) Electrodes	\$173,900
P/ANL2012-015	Mesoscale Elastic Problems	\$266,300
P/ANL2012-016	Knowledge Discovery in Microbial Community Composition and Metabolite Turnover Using Satellite Remote Sensing Data	\$125,400
P/ANL2012-052	Developing New Ce-based, High-efficiency Light-conversion Phosphors	\$101,600
P/ANL2012-055	Development of a Close-Packed LaBr <sub>3</sub> (Ce) Detector Array for Nuclear Physics Applications	\$117,100
P/ANL2012-061	Revealing Lithium-based Battery Performance by In Situ Characterization	\$210,000
P/ANL2012-072	Graphene Enabled Superlubricity: Vanishing Friction and Wear in Static and Sliding Contacts	\$149,700
P/ANL2012-074	Carbon Flux from Thawing Permafrost: Development of a Predictive Model Linking Microbial Activity and Biogeochemistry with Carbon Metabolism	\$448,600
P/ANL2012-082	A Novel Low-Level Software Architecture for Exascale Nodes	\$192,700
P/ANL2012-087	Rechargeable Nanofluids Technology for Electrical Energy Storage	\$117,000
P/ANL2012-114	Extreme-Scale Electromagnetic Modeling with Nanoscience Applications	\$202,500
P/ANL2012-180	Novel Non-Carbon Catalyst Support for PEMFCs	\$217,800
P/ANL2012-181	Curing Cancer with the Power of Fireflies	\$158,800
P/ANL2012-197	Development of Wavefront-Preserving Mirrors for Extreme Heat Load X-ray Beamlines	\$244,000
P/ANL2012-199	High-Heat-Load Hard-X-ray Monochromators	\$317,900
P/ANL2012-202	A Future for Energy-efficient General-purpose Computing based on Heterogeneity	\$155,200
P/ANL2012-203	Biofuel Chemical Kinetic Experiments to Advance the Modeling of Advanced IC Engine Combustion	\$292,500
P/ANL2012-204	Membrane Bound, Broad Spectrum, Photo-driven Protein Devices	\$69,000
P/ANL2012-205	Modeling the Interactions of Biophysical, Biogeochemical, and Microbial Dynamics in Permafrost-affected Soils: From Pore Scale to Regional Scale	\$159,600
P/ANL2012-206	Developing, Improving, and Testing Methods for Predicting Spatial and Vertical Distributions of Soil Organic Carbon at Regional Scales	\$114,100
P/ANL2012-207	Environmental Proteomics	\$164,100
P/ANL2012-208	20kV/10A 4H-SiC Vertical Trench Field-Controlled Thyristor (VTFCT)	\$285,200

P/ANL2012-209	Atomistically Informed Mesoscale Modeling for Advanced Electrical Energy Storage Systems	\$10,000
<b>Total # of Projects for ANL: 111</b>		
<b>Total Cost for ANL: \$28,870,000</b>		
<b>Total Administrative Cost \$27,100</b>		
<b>BNL - Brookhaven National Lab</b>		
09-001	Nanoscale Electrode Materials for Lithium Batteries	\$14,857
09-003	Organic Photovoltaics: Nanostructure, Solvent Annealing and Performance	\$215,984
09-005	Synergistic Interactions Between Poplar and Endophytic Bacteria to Improve Plant Establishment and Feedstock Production on Marginal Soils	\$1,886
10-006	Solar Energy Source Evaluation for Smart Grid Development	\$215,842
10-007	High Throughput Quantitative Biochemical Phenotyping	\$303,723
10-010	Development of an Ultrafast Electron Diffraction Facility for Condensed Matter Physics Challenges	\$218,891
10-012	Design of Pt-free Electrocatalysts for Fuel Cell Oxygen Reduction Reactions	\$106,561
10-014	Charge Generation and Transport in Films of Conjugated Polymers for Organic Photovoltaics BNL Part of a Collaborative NREL, BNL, ANL LDRD	\$326,088
10-015	Photoelectrochemical Fuel Generation from Water and Carbon Dioxide	\$403,645
10-016	Structural Basis of Light Perception by Phytochrome	\$116,664
10-017	New Model Organisms for Analysis of Plant Metabolism	\$69,210
10-025	Development of Large Liquid Argon Time Projection Chambers (LArTPC) for Future Neutrino Experiments	\$423,492
10-034	Spin Waves in Artificial Magnonic Crystals: Fabrication, Imaging and Scattering	\$57,431
10-039	EIC Polarized Electron Gun	\$459,218
10-040	Development of a Laser System for Driving the Photocathode of the Polarized Electron Source for the EIC	\$100,731
10-041	Simulation, Design, and Prototyping of an FEL, for Proof-of-Principle of Coherent Electron Cooling	\$159,434
10-042	Realization of an e+A Physics Event Generator for the EIC	\$87,903
10-043	Exploring Signatures of Saturation and Universality in e+A Collisions at eRHIC	\$190,095
10-044	Electroweak Physics with an Electron Ion Collider	\$131,770
10-045	LSST Astrophysics and Cosmology Initiative	\$131,411
11-001	Cloud and Precipitation 4D Radar Science	\$190,309

11-002	A Novel Approach to Parameterized Sub-Grid Processes in Climate Models	\$183,307
11-007	Deciphering the Molecular Mechanisms of Lignin Precursor Transportation	\$167,746
11-008	Touchless Micro-Crystallography	\$213,664
11-012	Multiscale Complexity of Energy and Material Use: Integrated Assessment of Technology and Policy Alternatives	\$143,046
11-016	Indium Iodide (InI) - A Potential Next-Generation Room-Temperature Radiation Detector	\$252,608
11-017	Visualization Support Infrastructure for Global Climate Modeling with a Focus on the BNL FASTER Project	\$79,068
11-020	Single Crystal Growth of Novel Energy Materials by High Pressure Method	\$220,417
11-025	Protein Microcrystal Dynamics by Coherent X-Ray Scattering	\$181,870
11-027	High-Resolution Biological Imaging by X-Ray Diffraction Microscopy	\$166,042
11-030	Sub-10 nm Resolution Soft X-Ray Microscopy of Organic Nano-Materials by Novel Diffraction Methods	\$142,422
11-032	2D Membrane Solution Scattering for Probing the Structures of Membrane Proteins	\$217,594
11-033	Exploring the Role of Glue in Hadron Structure by an Electron Ion Collider	\$187,511
11-036	CMOS-Pixel Vertex Detector for EIC	\$90,407
11-040	Study of FEL Options for eRHIC	\$58,082
11-050	Overcoming Electromagnetic Interference in Simultaneous PET and MRI for Biological and Clinical Imaging	\$289,565
11-051	Estrogen Biosynthesis as a Novel Imaging Target with Multiple Applications	\$290,413
11-053	High Throughput Screening in Biological Systems Using Radiometric Approaches	\$496,875
11-055	Astrophysics and Cosmology Initiative	\$371,858
12-007	Complex Modeling: Leveraging Advanced Scattering Data with Computation to Push Back the Materials Complexity Frontier	\$46,065
12-008	Early Deployment of Flagship Applications on BG-Q	\$386,700
12-012	Inter-Individual Variation in Radiation-Induced Epigenetic Modifications and their Potential Impact on Carcinogenesis	\$417,096

12-015	Developing an Integrated Atmosphere-Ecosystem Model for Investigating Interactions Between Atmospheric System and Ecosystem under a Warming Climate	\$207,525
12-018	Conical Slit for Probing Buried Micron or Sub-Micron Volumes for Dynamic Measurements of Heterogeneous	\$4,901
12-021	In-Situ Transmission X-Ray Microscopy Studies of Structure and Function in Energy Storage	\$54,057
12-022	MeV-UED for Ultrafast Science	\$206,866
12-023	Femto-Second X-ray Pulse Generation by Electron Beam Slicing	\$118,348
12-024	Thermochemical Conversion of Biomass to Fuels and Chemicals	\$236,911
12-025	Flow-Based Battery Architectures for Large-Scale Electrical Energy Storage	\$297,478
12-029	Demonstration of a Grid-Wide Measurement and Control Platform for Micro-Grids	\$140,429
12-032	Laser-Driven Proton Accelerator	\$119,939
12-033	Water-based Liquid Scintillator Detector for Neutrino and Proton Decay Experiments	\$80,428
12-034	Quantum Electrodynamics for QCD Precision Studies at the EIC	\$68,580
<b>Total # of Projects for BNL : 53</b>		
<b>Total Cost for BNL : \$10,062,963</b>		
<b>Administrative Cost Paid by Laboratory Overhead</b>		
<b>INL - Idaho National Lab</b>		
I07-052	Laser Induced Breakdown Spectroscopy: Development and Application of in-situ Elemental Analysis for Process Streams in Spent Fuel Reprocessing Facilities	\$267,132
I09-068	On-line Monitoring of Actinide Concentrations for Advanced Aqueous Separation Processes	\$41,796
I10-001	Neptunium redox chemistry in irradiated aqueous nitric acid	\$353,192
I10-007	ULTRASONIC TRANSDUCER SENSORS FOR IN-PILE DETECTION OF DIMENSIONAL CHANGES	\$379,837
I10-008	Irradiation-Induced Evolution of Defects and Microstructures in Nanocrystalline BCC Mo	\$290,309
I10-011	Degradation and Conversion of Lignin Using Extremophilic Systems	\$499,068
I10-014	Automated Differential Equation-Based Identification	\$72,347
I10-015	Optimization of Ceramic Waste Forms Used for Electrochemical Processing of Spent Nuclear Fuel	\$114,619



I10-017	Multiscale Modeling and Simulation of Nuclear Fuel Performance	\$1,012,277
I10-022	In-Pile Temperature Monitor and Control for ATR	\$160,250
I10-023	Study of preconditioning techniques for Krylov solvers applied to hybrid neutron transport calculations	\$59,189
I10-024	Small specimen test techniques for evaluating radiation-induced changes in mechanical properties	\$128,186
I10-026	Reversible Gas Phase Reactions for Recovery of Graphite from Recycled HTGR TRISO Fuel	\$299,312
I10-027	Comprehensive Thermodynamic Models for Aqueous Partitioning of Actinides from Used Nuclear Fuel.	\$249,718
I10-029	3D Spatial Representation in Support of Design Inspection and Verification	\$191,756
I10-031	Fickian and Thermal Diffusion in Nuclear Materials from Linear Response Theory and Multiscale Simulations	\$51,364
I10-032	Investigation of Molten Bromide Salt Systems for Separation and Recovery of Actinides from Fission Products	\$246,202
I10-037	Resilient Condition Assessment Monitoring (ReCAM) System	\$341,835
I10-053	Prediction and Monitoring of CO2 Behavior in Deep Reactive Geologic Formations	\$202,170
I10-056	Fabrication of Advanced ODS Alloys using Field Assisted Sintering	\$205,530
I10-058	Microstructural Evolution of UO2 and U Under Irradiation	\$268,913
I10-059	Feedstock Processing and Energy Storage	\$294,464
I10-060	Spatially-correlated microstructural characterization: From centimeters to nanometers	\$247,519
I10-064	Multi-Rate Shock Physics Simulation of Blast and Penetration Events in Concrete	\$232,531
I10-065	Water and Energy System Interdependency Modeling for Multicriteria Decision Analysis	\$325,231
I10-067	Hybrid systems process integration and dynamics studies	\$513,527
I10-068	Irradiation Testing and Molecular Modeling of Irradiation-Assisted Diffusion and Microstructural Evolution (FCCI)	\$290,413
I10-073	Next Generation Control System "Smart Grid" Simulation Environment	\$182,263
I10-075	Cognitive/Intelligent Wireless Communication Devices	\$768,389
I10-078	Development of Non-Lethal Methods for Enhanced Lipid Recovery from Microalgae	\$232,779
I10-079	Transmission Site Suitability Decision Support Technology	\$119,600

I10-080	Design and Operational Improvements and LCA in Anaerobic Digestion of Fermented Dairy Manure using a 2-Stage Process	\$181,725
I10-081	Design and Testing of a Mars Hopper	\$361,163
I10-083	In situ characterization of an oxide film for prediction of stress corrosion cracking susceptibility	\$135,377
I10-087	Biological Fixation of CO <sub>2</sub> for Fuel and Chemical Production Using Acetogen Intermediary Metabolism	\$232,700
I10-088	CAES Vertical Axis Wind Turbine Project	\$40,053
I10-092	Hybrid Osmosis Water Purification Systems Research	\$216,995
I10-093	Nuclear Reactor Safety Case Development: Models, Data, and Tools	\$800,463
I10-094	Advanced Visualization Using Immersive Environments	\$198,106
I11-000	Haptic Tele-Operated End Effector for Hazardous Environments	\$325,102
I11-005	Speciation Behavior of Americium Oxidation States for the Separation of Americium from Curium in Nuclear Processing	\$299,761
I11-006	Supercritical Fluid Extraction of Actinides from TRISO Reactor Fuels	\$166,799
I11-007	Integration of Renewable Energy Resources through Energy Storage and SuperGrid	\$232,476
I11-019	Electrochemical Production of Synthesis Gas From CO <sub>2</sub>	\$231,691
I11-022	Electronic Warfare Digital Communications and Network Traffic Modeling	\$240,172
I11-023	Development of a simplified soft donor technique for trivalent lanthanide actinide separations	\$249,517
I11-031	Mechanisms of self inhibition of catalytic conversion of CO <sub>2</sub> to methanol	\$232,309
I11-037	Development of In Reactor Experiment Configuration for Laser Based Material Properties Measurement	\$213,501
I11-041	In-situ micro-Raman spectroscopy and modeling of breakaway oxidation of zircaloy cladding	\$86,520
I11-042	Experimental Cyber Security - Vulnerability Prediction, Discovery and Mitigation	\$593,324
I11-043	Characterization of the Nanomechanical Response of Material to Determine Key Variables in Stress Corrosion Cracking	\$127,019
I11-045	Multiscale Coupled Hydrogeophysics Modeling-Advancing Understanding of Reactive Transport and Effective Subsurface Environmental Monitoring	\$206,045
I11-046	Known Secure Sensor Measurements For Detecting Unauthorized Process Manipulation and Falsification of State	\$464,004

I11-051	Alternative Processing for Improved UO <sub>2</sub> -Based Fuels	\$713,685
I11-055	Spatially Resolved Positron Analysis of Hydride Formation in LWR Fuels with GE-Global Nuclear Fuels	\$257,274
I11-059	Unconventional Radiation Detection Methods for Nuclear Nonproliferation, Safeguards, and Treaty Verification	\$190,587
I11-060	SMC Advanced Armor Materials and Systems R&D and D&D	\$397,234
I11-061	Advanced Modeling and Simulation Concepts for ATR	\$701,447
I11-062	Full-Scope Human System Simulation Laboratory for Plant-Specific and Generic NPP Simulator Models Studies	\$250,231
I11-064	Dynamic Thermo-Mechanical Energy Conversion Simulation	\$207,265
I11-065	Development and Demonstration for National Fuel Efficiency	\$110,522
I11-066	Targeted Energy Management Toolset for Comfort and Savings Based on Advanced Computational Intelligence Techniques	\$232,360
I11-069	Industrial control system threat axis analysis to characterize and quantify malicious intent from a threat actor	\$489,864
I11-074	Uncertainty Analysis for Multiscale Models of Nuclear Fuel Performance	\$252,400
I11-075	Uncertainty Analysis of Mesoscale Models of Radiation Effects in Materials	\$107,717
I11-076	Exploratory Nuclear Reactor Safety Analysis and Visualization via Integrated Topological and Geometric Techniques	\$205,435
I11-077	Prototype INL Wildland Fire Early Warning and Situational Awareness System	\$6,874
I11-078	Enabling Dynamic Spectrum Access in Long Term Evolution (LTE) Networks	\$205,559
I12-001	Long Term Evolution Wireless Cyber Security	\$348,084
I12-007	Uncertainty Quantification of Safety Codes using A Bayesian Approach with Data from Separate- and Integral-Effects Tests	\$136,553
I12-013	Olefin Gas Separations using Embedded Transition Metal Chelates in Polymeric Membranes	\$199,176
I12-017	Polymer components in laminate armor systems for ballistic protection	\$230,495
I12-026	Protectiveness and stability of the zirconium oxide in early-phase corrosion of zirconium alloys - predictive relations to surface structure and composition	\$217,194

I12-031	2-D and 3-D EBSD Technique Development and Microstructure Reconstruction for Phase Field Microstructure Evolution Models	\$140,957
I12-043	Science Based Simulation Model of Human Performance for Human Reliability Analysis	\$189,236
I12-045	Development of An Uncertainty Quantification Method for MIR Facility	\$333,902
I12-046	A Novel Bioreactor to Study the Human Microbiome	\$207,537
I12-049	Coupled Neutral to Charged Particle Transport Algorithms and Detectors	\$131,240
I12-050	Cross Section Representations for Nuclear Nonproliferation	\$201,167
I12-051	Thermo- and Acid-Stable Enzymes for Improved Animal Feed Nutrient Digestion	\$101,267
I12-054	Treaty Verification with Photo-Induced Prompt Signatures	\$167,716
I12-056	Recovery of Precious Metals from Used Nuclear Fuel and Electronic Waste Using Sulfur-Impregnated Nanoscaffolds.	\$214,227
I12-059	Chemistry and Flowsheet Development for Lanthanide Separations	\$285,671
I12-061	Development of a High Burn up Zr Based Fuel Cladding for LWRs	\$165,685
I12-062	Development of Diamond Based Sensors for User Facility Capabilities at INL Advanced Test Reactor	\$179,432
I12-066	Electronic Energetic Initiation	\$148,097
I12-069	Fast Identification of Chemical Warfare Agents, Explosives, and Radionuclides with Lanthanum Bromide Gamma-Ray Detectors	\$141,380
I12-070	Separate Effects Fuels Development Capability	\$449,534
I12-071	Battery Resilient Monitoring and Control	\$146,628
I12-073	A Nonproliferation Focused Study and Comparison of the GEANT4 Simulation Toolkit and MCNP Functionality, Accuracy, and Development Needs	\$189,191
I12-077	Observation of zirconium oxidation at atomic level using non-linear optical spectroscopy	\$176,775
I12-080	Characterization of intergranular corrosion using thermal wave imaging	\$182,066
I12-081	Demonstration of Total Ion Control (TIC) Technology	\$198,954
I12-082	Resilient Monitoring, Adaptation, and Control (ReMAC) System	\$153,571
I12-086	Alert/Alarm Dashboard	\$140,836
I12-089	Multi-agent Analysis to Characterize Complex Infrastructure Interdependencies	\$191,281

I12-090	Development of emissivity-tuned, robust encapsulated radioisotope heat sources for NASA's new advanced Radioisotope Thermo-Photovoltaic (RTPV) power system.	\$192,759
I12-092	Multi-Modal Radiation Detection for Nuclear Nonproliferation and Treaty Verification	\$199,603
I12-093	Development of unique nanomaterials for selective replacement of strategic & critical materials	\$225,107
I12-094	Unmanned Aerial Vehicle-based Remote Sensing & Data Fusion for Energy & Environmental Applications	\$48,358
I12-095	Power Line Field Wave Analysis	\$209,839
I12-096	Isolation and purification of critical metals using ionic liquid based solvent extraction	\$233,799
I12-099	Designing algal biofuel consortia for increased function and reduced nutrient costs	\$232,058
I12-100	Multiphase Flow Modeling Capability for Waste-to-Energy Process Development	\$105,793
I12-101	Development of full-waveform LiDAR capabilities for water resources and vegetation monitoring	\$274,993
I12-105	Lower Boise River Water Quality and Natural Resources Management	\$114,652
I12-107	Targeted elimination of pharmaceutical compounds from municipal wastewater effluent and solids	\$231,671
I12-108	Bakken Hydraulic fracturing Water Needs and Potential Impacts to the Fox Hills/Hell Creek Aquifer- a Spatial-Temporal Approach	\$280,714
I12-111	Understanding the importance of the role of soil moisture effects for estimating snowmelt runoff in a mountainous, snowmelt-driven watershed	\$202,307
I12-112	Reactor Coolant Pump Alternate Can Material Development Program	\$76,878
I12-113	Coupled Smoothed Particle Hydrodynamics and Discrete Element Model (SPH-DEM) Simulations of Hydraulic Fracturing and Shale Gas Production	\$284,225
I12-116	Monitoring and Control of the Hybrid Laser-GMAW Process	\$114,678
I12-117	Feasibility of a Broad Application Test Reactor using LEU	\$465,243
I12-118	A Leap Ahead in Energy Storage - An Integrated Approach to an Inorganic High Energy Lithium Battery	\$171,437
I12-120	Modeling Guided Development of Nanostructured High Energy Electrode Materials for Li-Ion Batteries	\$128,598
I12-121	State Awareness for Smart Grid Electrical Load Balancing, Distribution and Security	\$99,483

I12-124	Model Development for Transient Performance Analysis of a Small Modular Reactor in a Hybrid Energy System	\$64,762
I12-129	Nuclear Hybrid Energy Systems: Reactor Subsystem Modeling and Infrastructure Development for Integrated Hardware Testing	\$50,091
<b>Total # of Projects for INL: 118</b>		
<b>Total Cost for INL: \$28,379,894</b>		
<b>Total Administrative Cost \$362,076</b>		
<b>KCP - Kansas City Plant</b>		
11EDGE002-704103	NSMC PDRD Project	\$20,740
11EDGE005-704110	NSMC PDRD Project	\$1,854
11EDGE009-704115	NSMC PDRD Project	\$277
11EDGE012-704121	NSMC PDRD Project	\$39
11EDGE013-704122	NSMC PDRD Project	\$9,367
11EDGE015-704127	NSMC PDRD Project	\$585
11EDGE022-704146	NSMC PDRD Project	\$312
11EDGE023-704147	NSMC PDRD Project	\$57,859
12EDGE002-704189	NSMC PDRD Project	\$63,161
12EDGE003-704219	NSMC PDRD Project	\$61,518
12EDGE004-704221	NSMC PDRD Project	\$282,508
12EDGE005-704222	NSMC PDRD Project	\$5,204
12EDGE006-704223	NSMC PDRD Project	\$12,331
12EDGE008-704231	NSMC PDRD Project	\$378,912
12EDGE009-704332	NSMC PDRD Project	\$65,316
12EDGE010-704238	NSMC PDRD Project	\$14,054
12EDGE013-704227	NSMC PDRD Project	\$40,875
12EDGE014-704228	NSMC PDRD Project	\$57,653
12EDGE015-704304	NSMC PDRD Project	\$18,281
12EDGE016-704311	NSMC PDRD Project	\$65,935
12EDGE017-704305	NSMC PDRD Project	\$88,882
12EDGE018-704321	NSMC PDRD Project	\$15,658
12EDGE019-704308	NSMC PDRD Project	\$17,236
12EDGE021-704303	NSMC PDRD Project	\$173,313
12EDGE022-704316	NSMC PDRD Project	\$54,747
12EDGE023-704314	NSMC PDRD Project	\$10,576
12EDGE024-704318	NSMC PDRD Project	\$10,476
12EDGE025-704998	NSMC Mid-Year Call	\$718,236
12EDGE026-704306	NSMC PDRD Project	\$79,782
12EDGE027-704309	NSMC PDRD Project	\$32,008
12EDGE028-704312	NSMC PDRD Project	\$50,071
12EDGE029-704319	NSMC PDRD Project	\$214,063
12EDGE20-704300	DMSMS Tool Evaluation	\$33,389
KCP08781-703745	Rapid Response Technology Evaluation	\$132,807

KCP101005-703212	BNNT	\$280
KCP101007-703215	Conjugated Dienne Elastomer Development	\$28,090
KCP101011-703236	Aerosol Jet Printing	\$29,524
KCP101231-704085	Semi-Custom Electrical Contact	\$77
KCP10962-703204	GTS Acid Cleaning Elimination	\$3,201
KCP10972-703226	FO Embedded Data Acquisition	\$4,942
KCP10998-703244	Super Getters Based on MOF's	\$239,664
KCP111040-704009	EM Underground Modeling	\$1,668
KCP111048-704010	Look Ahead Sensor Development	\$280,367
KCP111055-704047	Next Generation Wide Angle Laser Transmitter	\$2,251
KCP111065-704048	Next Generation Ground Truth Feedback	\$2,968
KCP111069-704056	Weld Residual Stress Technique	\$155,940
KCP111098-704024	Laser Weld Automation	\$210
KCP111103-704061	Q-Measurements	\$9,002
KCP111140-704058	Wear-resistant Ceramic Evaluation	\$155,377
KCP111141-704076	Alternate Foams & Encapsulents	\$160,763
KCP111143-704065	Pb Free Component Refinishing	\$572
KCP111150-704066	Modeling of Micro Materials	\$763
KCP111151-704007	Radar RX with Thin Film Passives	\$454,086
KCP111168-703390	Shell Mfg Development	\$81,133
KCP111169-704002	DLC Heat Sinks	\$376,657
KCP111173-704069	New Test Capability for Radars	\$41,404
KCP111175-704013	LDI for Precision Graphics	\$28,405
KCP111176-704004	Hermetically Sealed F/O	\$73,946
KCP111192-704091	Vibration Damage Assessment	\$74,745
KCP111198-704005	Adhesion of Thin Film on LTCC	\$79,183
KCP111206-704067	RFIC MCM Rework	\$8,841
KCP111207-704074	3D Flex Cables	\$191
KCP111218-704083	Q-Enhanced Filters	\$1,600
KCP111236-704032	SL Wave Classification	\$4,206
KCP111240-704075	Micro-reactors	\$149,221
KCP12-1525-704252	Gas Laser Sensor Evaluation	\$167,622
KCP120000-704181	High Frequency Thin Film LTCC	\$330,233
KCP120000-704250	Embedded Evaluation Technology Improvements	\$223,323
KCP121286-704500	KO Short Term Projects	\$410,645
KCP121313-704157	Sensitive Document Potability	\$48,018
KCP121315-704154	High Frequency Vibration	\$121,380
KCP121325-704171	Miniature Fastener Preload	\$95,640
KCP121328-704170	DLC Validation & Inspection	\$126,347
KCP121331-704166	Glass Crack Detection	\$107,385
KCP121339-704173	Material Interface Modeling	\$121,663
KCP121342-704174	LA UT Piston Mass Sensing	\$313,179
KCP121344-704179	TriboMAM-Deep Hole Drilling	\$51,473
KCP121350-704192	FEA of Casting Solidification	\$74,241

KCP121354-704186	Nanoparticle Solubility, Dispersion and Processability	\$502,322
KCP121356-704167	Additive Manufacturing	\$276,659
KCP121357-704198	High G Onset Vibrafuge	\$130,994
KCP121358-704172	Optical Gaging	\$213,584
KCP121359-704178	High Frequency Low Loss LTCC	\$243,987
KCP121366-704161	Nanofibers for Advanced Composites	\$194,388
KCP121373-704190	Cloud Based Services	\$105,796
KCP121377-704208	Variable Acceleration Evaluation	\$190,838
KCP121379-704213	Forging Residual Stress	\$123,755
KCP121384-704177	Milling Bifurcation	\$48,209
KCP121385-704182	Advanced Satellite Data Link	\$17,101
KCP121386-704183	RWSN Mesh Network Upgrade	\$83,834
KCP121389-704184	Advanced HF Radio Network	\$42,785
KCP121394-704200	Vehicle Maintenance Reasoning	\$96,749
KCP121395-704215	Model Based Definition	\$134,290
KCP121403-704212	Evaluation of Cathode Luminescence	\$32,695
KCP121404-704211	Sessile Drop Measurements	\$50,117
KCP121417-704168	Solid Model Mapping	\$101,637
KCP121419-704187	Fiber Optic Cable Modeling	\$373,929
KCP121421-704204	Laser Damage in Bent Fibers	\$242,445
KCP121431-704185	High Impact Web-Based Training	\$84,836
KCP121442-704199	Data Acquisition on Beam	\$45,862
KCP121478-704242	Large Mass Launcher Evaluation	\$211,147
KCP121524-704251	Evaluation of Laser Fab Processes	\$815,703
<b>Total # of Projects for KCP: 102</b>		
<b>Total Cost for KCP: \$11,792,113</b>		
<b>Total Administrative Cost \$386,339</b>		
<b>LANL - Los Alamos National Lab</b>		
LANL-20090498PRD2	Measurement of Transverse Single-Spin Asymmetries of Neutral Pion and Eta Meson Production in Polarized p+p Collisions Using the PHENIX Detector at RHIC	\$50,424
LANL-20090520PRD2	Quantum Information Processing: Capabilities and Limitations	\$94,862
LANL-20090521PRD2	Exploring the Expanding Universe and the Nature of Dark Energy	\$81,513
LANL-20090530PRD2	Theoretical Investigations of Ribosome Dynamics	\$6,127
LANL-20090535PRD3	Experimental Studies On the Origin of Nucleon Spin	\$12,352
LANL-20090537PRD3	Casimir Interactions and Their Applications to Nanomachines and Atom-Chips	\$21,751
LANL-20090538PRD3	Biocompatibility and Nanotoxicity: Characterization and Manipulation of Interactions at the Biomolecule-Nanomaterial Interface	\$15,393



LANL-20100006DR	Nanoscale Superconductivity for Single Photon Detection	\$1,622,551
LANL-20100015DR	New Generation Hydrodynamic Methods: from Art to Science (U)	\$1,401,403
LANL-20100023DR	Cosmological Signatures of Physics Beyond the Standard Model: Petascale Cosmology Meets the Great Surveys	\$1,525,643
LANL-20100025DR	Integrated Experimentation and Hybrid Modeling for Prediction and Control of Multiphase Flow and Reaction in CO <sub>2</sub> Injection and Storage	\$1,631,449
LANL-20100026DR	Isolating the Influence of Kinetic and Spatial Effects on Dynamic Damage Evolution	\$1,559,558
LANL-20100027DR	Transformative Bioassessment of Engineered Nanomaterials: Materials by Design	\$1,535,850
LANL-20100030DR	Optimization and Control Theory for Smart Grids	\$1,463,354
LANL-20100040DR	Intelligent Wind Turbines	\$1,714,965
LANL-20100043DR	Understanding and Controlling Complex States Emerging from Frustration	\$1,952,715
LANL-20100044DR	First Principles Predictive Capabilities for Transuranic Materials: Mott Insulators to Correlated Metals	\$1,630,556
LANL-20100045DR	Information Science for Understanding Complex Quantum Matter	\$1,617,798
LANL-20100048DR	Molecular Forensic Science of Nuclear Materials	\$1,596,417
LANL-20100063DR	CLEAN Detection & Identification of Dark Matter	\$2,186,484
LANL-20100073DR	Understanding, Exploiting, and Controlling Competing Interactions in Complex Oxides	\$1,549,403
LANL-20100089DR	Upgrading Renewable and Sustainable Carbohydrates for Production of High Energy Density Fuels.	\$1,612,812
LANL-20100097DR	Probing Brain Dynamics by Ultra-Low Field Magnetic Resonance	\$1,635,121
LANL-20100129ER	A Molecular View of Cellulase Activity: A Single-Molecule Imaging and Multi-Scale Dynamics Approach	\$354,281
LANL-20100141ER	Earth Tremor, Time Reversal and Earthquake Forecasting	\$333,375
LANL-20100144ER	New Generation "Giant" Nanocrystal Quantum Dots for Transformational Breakthrough in Solid State Lighting	\$410,088
LANL-20100160ER	New Catalytic Methods for Selective C-C Bond Cleavage in Lignin: Towards Sustainable and Renewable Chemicals and Fuels	\$336,405
LANL-20100172ER	Probing the Structure of Superconducting States with Rotating Magnetic Field	\$430,181
LANL-20100182ER	Biocatalysts: A Green Chemistry Approach to Industrially Relevant Compounds	\$433,681
LANL-20100183ER	Ultrafast Cathodoluminescence for Improved Gamma-Ray Scintillators	\$427,475

LANL-20100184ER	Characterizing the Th-229 Isomer: A Nuclear Clock Candidate	\$412,159
LANL-20100189ER	A Plasma-Based Ultrafast THz Source	\$272,156
LANL-20100191ER	Hawking-Unruh Effect in Atomic Bose-Einstein Condensates	\$322,302
LANL-20100210ER	Understanding and Controlling Complex States of Matter in New Iron-arsenide Superconductors through Strain and Disorder	\$465,122
LANL-20100215ER	Bacterial Invasion Reconstructed Molecule by Molecule	\$357,037
LANL-20100228ER	Developing Actinide Catalysis for Cleaning Dirty Fossil Feedstocks	\$511,617
LANL-20100230ER	Planetary Analog Geochemical Explorations with Laser-Induced Breakdown and Raman Spectroscopies	\$278,878
LANL-20100237ER	One-Dimensional Nanomaterials for Enhanced Solar Conversion	\$412,041
LANL-20100241ER	A Metamaterial-Inspired Approach to RF Energy Harvesting	\$416,127
LANL-20100257ER	Metabolic Regulation of Light-harvesting and Energy Transfer	\$352,825
LANL-20100261ER	Electron Spin Injection, Transport and Detection in Semiconductor Nanowires	\$416,708
LANL-20100262ER	Ultra High Quality Electron Source for Next Generation Vacuum Electronic Devices	\$297,742
LANL-20100273ER	A Novel Brownian-Poisson Algorithm for Modeling Ion Transport through Artificial Ion Channels	\$360,061
LANL-20100285ER	Transformational Approach for the Fabrication of Semiconductor Nanowires: "Flow" Solution-Liquid-Solid Growth	\$370,997
LANL-20100296ER	Cold Atoms in Quantum Periodic Potentials	\$351,080
LANL-20100298ER	Unraveling Electron-Boson Interactions in High-Tc Superconductors With Ultrafast Infrared Spectroscopy	\$365,023
LANL-20100302ER	BEC Waveguide Optics	\$361,502
LANL-20100308ER	GO FISH, A Smart Capture and Detection Strategy for Intact and Viable Pathogens	\$380,302
LANL-20100310ER	Digital Trigger for the High Altitude Water Cherenkov (HAWC) Observatory	\$482,730
LANL-20100312ER	Understanding Arctic Hydrologic Response to Climate Change	\$376,096
LANL-20100328ER	Deciphering the Controlled Chaos of Intrinsically Disordered Proteins	\$375,042
LANL-20100366ER	Ultra-Fast DFT-Quality Forces for Molecular Dynamics Simulations of Materials	\$310,138
LANL-20100389ER	Solid State Neutron Detector	\$357,688
LANL-20100394ER	Probing the Origin of Matter in the Universe	\$282,237

LANL-20100395ER	Parallel Algorithms for Robust Phylogenetic Inference	\$397,037
LANL-20100413ER	Revolutionizing Short-Pulse Laser Generation using Stimulated Raman Scattering	\$326,332
LANL-20100438ER	Surface Fitting for Thermodynamically Consistent Evaluation of Tabular Equations of State	\$373,499
LANL-20100441ER	LES Modeling for Predictive Simulations of Material Mixing	\$382,905
LANL-20100456ER	Algal Lipid Regulatory Networks	\$357,183
LANL-20100460ER	Robust Unsupervised Operation Under Uncertainty Through Information Theoretic Optimization of Complex Systems.	\$274,004
LANL-20100469ER	Controlling Charge Recombination Processes in "Giant" Nanocrystal Quantum Dots Toward High-Efficiency Solid-State Lighting	\$366,255
LANL-20100479ER	Modeling the Global Circulation and Evolution of Influenza A Virus	\$369,690
LANL-20100531DR	Bridging Equilibrium and Non-equilibrium Statistical Physics	\$874,685
LANL-20100594PRD1	Control/Path Planning Strategies for Nonholonomic, High-Speed, Autonomous Unmanned Ground Vehicles	\$112,318
LANL-20100595PRD1	Development of an Acoustic Exotic Metamaterial Slab Using the Acoustic Radiation Force and Micro-streaming of High-order Bessel Helicoidal Beams	\$96,762
LANL-20100596PRD1	Atomic Interface Design of Nanocomposites for Extreme Mechanical Loadings	\$83,960
LANL-20100598PRD1	Multi-scale Computational Approach for Studying Radiation Resistant Nanoclustered Alloy	\$79,157
LANL-20100599PRD1	Extra-Long-Range Energy Transfer in Hybrid Semiconductor-Metal Nanoassemblies	\$73,276
LANL-20100601PRD2	Unique Semiconductor Nanowire Heterostructures in Physics and Applications	\$238,493
LANL-20100603PRD2	Analysis of Protein Structure-Function Relations in Antibiotic Biosynthesis and Signal Transducing Receptors	\$216,764
LANL-20100604PRD2	Quantitative Modeling of Cellular Noise	\$206,627
LANL-20100606PRD2	Perfect Fluidity in Universal Quantum Systems	\$104,269
LANL-20100607PRD2	Search for CP and CPT Violation in the Neutrino Sector	\$114,043
LANL-20100608PRD2	Seeing the Invisible: Observational Signatures of Dark Matter	\$113,709
LANL-20100610PRD2	Probing Fundamental Physics with Cosmological Surveys	\$139,972
LANL-20100611PRD2	Physics of Cosmic Ray Shocks and the High Energy Universe	\$49,712
LANL-20100619PRD2	Quantum knowledge: a revolutionary approach to measurement	\$70,456

LANL-20100624PRD3	Polymer-Coated Surfactant Micro-reactors for Applications in Chemical Sensing, Contaminant Remediation and Synthetic Biology	\$21,335
LANL-20100625PRD3	Roles of Fungi in Terrestrial Ecosystem Carbon Cycling	\$26,115
LANL-20100626PRD3	Growth of Actinide-Nanocomposites using Hyperbaric Laser Chemical Vapor Deposition.	\$120,213
LANL-20100627PRD3	Stochastic Spatially Explicit HIV Dynamic Models	\$189,190
LANL-20100628PRD3	Engineering of Phosphotriesterase Enzymes for Nerve Agent Degradation	\$170,457
LANL-20100629PRD3	Non-Condon and State Interaction Effects in Carbon Nanotubes	\$152,168
LANL-20100631PRD4	Modeling the Surface Mass Balance and Freshwater Runoff from the Greenland Ice Sheet in a Changing Climate	\$223,001
LANL-20100632PRD4	A New Regime of Carrier Multiplication Using Intraband Re-Excitation of Nanocrystals	\$177,302
LANL-20100633PRD4	Attosecond Probing of Dynamical States in Solids - Graphene	\$152,241
LANL-20100634PRD4	Shockwaves as Diagnostic of Strongly Coupled Plasmas	\$70,725
LANL-20100635PRD4	Heavy quarks in Cold Nuclear Matter and in the Quark Gluon Plasma	\$187,602
LANL-20100636PRD4	The Formation and Evolution of Black Holes in the Universe	\$170,665
LANL-20110009DR	Radioparagenesis: Robust Nuclear Waste Form Design and Novel Materials Discovery	\$1,590,997
LANL-20110011DR	Hydrogen Effects in Delta-Stabilized Pu Alloys: Fundamental Thermodynamics and Interactions at Reduced Dimensionality	\$1,937,334
LANL-20110012DR	First Reactions: Simple Molecule Chemistry Behind the Shock Front	\$1,567,821
LANL-20110014DR	Terrestrial Vegetation, CO2 Emissions, and Climate Dynamics	\$1,757,757
LANL-20110027DR	Harnessing Nonlinearity for Transformative Metamaterial Technology	\$1,617,851
LANL-20110029DR	Innovative and Validated Sub-micron to Meso-scale Modeling of the Evolution of Interface Structure and Properties under Extreme Strains	\$1,671,635
LANL-20110032DR	Multi-Messenger Signals from Low-Mass Supernovae	\$1,779,613
LANL-20110034DR	Advanced Metagenomic Analysis to Understand Dynamics of Soil Microbial Community under Conditions of Climate Change	\$1,873,765
LANL-20110043DR	Probing New Interactions with Neutron Beta Decay	\$1,748,026
LANL-20110046DR	Network-Centric Quantum Communications	\$1,709,852

LANL-20110051DR	Illuminating the Dark Matter of the Genome: Small RNAs as Novel Targets for Bioterrorism Countermeasures	\$1,749,346
LANL-20110067DR	Exploiting Hamiltonian Properties of Beams to Revolutionize X-Ray Free-Electron Laser Architectures	\$1,631,951
LANL-20110081DR	Multi-Scale Science Framework for Climate Treaty Verification: Attributing and Tracking Greenhouse Gas Fluxes Using Co-Emitted Signatures	\$1,714,342
LANL-20110083DR	Next Generation Ionic Liquids for Plutonium Science, Separation, and Production	\$1,410,718
LANL-20110093DR	Multi-Perspective Network-Scale Modeling & Detection for Cyber Systems	\$1,635,023
LANL-20110098ER	Jet Probes of New Physics at RHIC and at the LHC	\$303,356
LANL-20110108ER	Daylight Imaging with Seismic Noise	\$348,976
LANL-20110126ER	Rare Category Detection	\$372,687
LANL-20110138ER	Superconducting Vortices in Magnetic Media	\$512,985
LANL-20110139ER	Novel Anti-Perovskite Electrolytes for Superionic Lithium Transport	\$366,510
LANL-20110141ER	Exploration of Megawatt Heat Pipe Reactor Concepts	\$382,093
LANL-20110150ER	Balanced and Unbalanced Turbulent Cascades	\$357,318
LANL-20110166ER	Grayscale Flow Cytometry - Multicoil NMR Sensors for Portable Flow Cytometry	\$356,744
LANL-20110168ER	Biofuel from Magnetic Algae	\$339,071
LANL-20110181ER	Exact Renormalization Method for Frustrated Systems and Optimization	\$382,806
LANL-20110184ER	Understanding Thunderstorm Effects on the Ionosphere: a New Approach to Investigate Possible Convective and Electrical Coupling Mechanisms	\$365,768
LANL-20110189ER	Computational Modeling of Topo-Taxis: Directing the Motion of Bacteria and Cells with Microfabricated Topologies	\$394,635
LANL-20110190ER	Understanding Earth's Deep Water Cycle: Neutron Diffraction and Calorimetric Studies of Hydrous Minerals	\$401,425
LANL-20110195ER	Algorithmic Co-Design: Paradigms for Unstructured Problems on Accelerated Architectures	\$369,187
LANL-20110212ER	Quasiparticle Scattering for Multiscale Modeling of Electronic Materials	\$364,540
LANL-20110228ER	Time-Dependent Quantum Molecular Dynamic Simulations of Dense Plasmas Supporting Thomson X-ray Scattering Experiments	\$372,850
LANL-20110230ER	Extreme Quantum Simulation: Co-Design from Desktop to Exa-Scale	\$394,502
LANL-20110236ER	Solving the Active Site Conundrum in Oxygen Reduction Catalysis	\$336,523
LANL-20110246ER	Innovative Process for Making Ultra-thin Dielectrics	\$462,700

LANL-20110258ER	Precision Measurement of Atomic Parity Violation in Trapped Yb+	\$466,422
LANL-20110264ER	High Density Neuronal Recording Using Nanowire Capacitor Sensors	\$365,047
LANL-20110267ER	Full-Frame Programmable Spectral Imagers Based on Micro-Mirror Arrays	\$373,071
LANL-20110290ER	Embedding Plasmonic Nanostructures at Semiconductor Interfaces for Enhancing Photovoltaic Efficiency	\$396,251
LANL-20110300ER	The Largest Cosmic Implosions: Formation of Supermassive Black Holes	\$351,804
LANL-20110306ER	"Listening" to the Noise of a Single Electron Spin: Methods for Fast, Ultra-sensitive, Non-perturbative Noise Spectroscopy	\$352,447
LANL-20110311ER	The Terahertz Quantum Hall Effect	\$358,283
LANL-20110320ER	Novel Broadband Tera Hertz Sources for Remote Sensing, Security and Spectroscopic Applications	\$445,991
LANL-20110338ER	Bio-analogue Catalysts: Evolved Aptazymes for the Hydrolysis of Organophosphorous Compounds	\$467,441
LANL-20110341ER	A Compact, Brilliant, Coherent X-ray Source Based on a Dense Relativistic Electron Mirror	\$535,794
LANL-20110356ER	Foundational Methods and Experiments in Ultracold Molecular Physics	\$527,014
LANL-20110358ER	Developing a Mild Catalytic Route for the Reduction of N <sub>2</sub> to NH <sub>3</sub>	\$362,795
LANL-20110363ER	Determination of Fluid Properties at Carbonate Interfaces - An Integrated Experimental and Theoretical Approach	\$402,611
LANL-20110411ER	Restoring Neurological Function with Self-assembled Lipid Bilayers	\$376,753
LANL-20110412ER	Understanding the Mechanisms of Biological Transport for Nano-technology Applications	\$320,347
LANL-20110421ER	Photo-triggerable Immolative Polymers: A New Modality for Radiation Dosimetry	\$371,836
LANL-20110425ER	Pyroelectric Heat Engines: Highly Efficient, Environmentally Friendly Cooling	\$480,970
LANL-20110434DR	Correlations and Dynamics in Information Science	\$599,709
LANL-20110435DR	Multi-scale Dynamics of Biological Systems	\$554,149
LANL-20110437ECR	Host-Mediated Adaptation of Influenza	\$228,461
LANL-20110470ECR	Solar Energetic Particles Entry and Trapping in the Magnetosphere: Filling a Major Space Weather Gap	\$199,288
LANL-20110483ECR	Non-Precious Metal Cathode Catalysts for Lithium-Air Batteries	\$236,279
LANL-20110487ECR	Combined Correlated NMR-Electromagnetic Spectroscopy and Imaging	\$218,686

LANL-20110488ECR	Multi-Source Energy Harvesting for Remote Power Applications	\$192,707
LANL-20110508ECR	Rational or Irrational Design? A Synergistic Approach to Evolving an Industrially Important Enzyme	\$253,249
LANL-20110516ECR	Identifying, Creating, and Controlling Functional Hotspots in DNA	\$155,763
LANL-20110535ECR	Mechanistic Studies Toward an Improved Carbonic Anhydrase for Biofuel Production.	\$249,251
LANL-20110537ECR	Exploiting Non-Innocent Ligands in Catalysis: New Base Metal Catalysts for the Reduction of Carbon Dioxide	\$221,660
LANL-20110542PRD1	Mechanistic Investigation of C-C Bond Forming Reactions for the Production of Long Chain Hydrocarbons	\$136,455
LANL-20110544PRD1	Auger-Recombination-Free Nanocrystals by Rational Design of Confinement Potential	\$157,079
LANL-20110549PRD1	Exploiting the Fermi Surface to Understand Quantum Criticality in Complex Electronic Materials	\$155,921
LANL-20110556ECR	Low-Frequency Acoustic Interferometry for Probing the Stratosphere.	\$133,077
LANL-20110573ECR	Development of an Interface-Dislocation Dynamics Model to Incorporate the Physics of Interfaces in Predicting the Macroscopic Mechanical Properties of Nanoscale Composites	\$235,829
LANL-20110575PRD1	Optimization of Heterogeneous Sensing Systems for Risk-Minimized Decision Making	\$179,802
LANL-20110580PRD2	Non-aqueous Organic Materials for Bio-defense	\$218,376
LANL-20110581PRD2	Metal Catalysts for Oxidation of Lignocellulose and Reduction of Carbon Dioxide	\$188,347
LANL-20110583PRD2	CP Violation in Scenarios Beyond the Standard Model	\$166,282
LANL-20110606PRD2	Aberration-corrected Transmission Electron Microscopy Study of Interfaces in Multilayered Composites	\$118,448
LANL-20110633PRD2	Universal Physics with Ultracold Atoms	\$236,698
LANL-20110645PRD2	Chemical Reactivity Signatures of Uranium Fluorides	\$61,640
LANL-20110710DR	Optimization Principles for Co-Design applied to Molecular Dynamics	\$1,294,898
LANL-20110711PRD2	Quantum simulations: From superconductivity to nanoscale electronics	\$192,762
LANL-20110716PRD2	Multiferroic Magnetoelectric Hybrid Inorganic-Organic Frameworks	\$164,433
LANL-20110733PRD2	Nano-spintronics: Spin Injection, Transport and Detection in One-dimensional Semiconductor Nanowires	\$136,760
LANL-20110735PRD2	A New Drift Shell Integration Technique for Inner Magnetospheric Space Weather Models	\$169,861
LANL-20110736PRD2	Shortcuts to Adiabaticity in Quantum Devices	\$222,157

LANL-20110737DR	CoCoMANS: Computational Co-design for Multi-scale Applications in the Natural Sciences	\$2,122,451
LANL-20110746ER	InfoFusion: "Connecting the Dots" Using Cyberspace Information Models	\$139,724
LANL-20110747PRD3	"Listening" to the Noise of a Single Electron Spin: Ultra-sensitive, Non-perturbative Spin Noise Spectroscopy	\$151,267
LANL-20110748PRD3	Probing the Structure of Superconducting States with Rotating Magnetic Fields	\$166,562
LANL-20110749PRD3	Determining the Origin of the Highest Energy Cosmic Rays with TeV Gamma-Ray Observations	\$161,299
LANL-20110750PRD3	Influence of Velocity Shear on Turbulent Magnetic Reconnection at the Earth's Magnetopause	\$161,604
LANL-20110751PRD3	Novel Laboratory and Field Observations to Model Climate Warming by Aged Absorbing Aerosols	\$162,192
LANL-20110752PRD3	Catalysts Containing Earth Abundant Metals for Energy Applications	\$107,177
LANL-20110753PRD4	Direct Tracking of Charge Carriers in Heterostructured Nanowires	\$114,697
LANL-20110754PRD4	Investigation of the electronic structure of heavy fermions using ARPES and tr-ARPES	\$138,581
LANL-20110755PRD4	Probing the Nucleon Structure via Spin Observables	\$75,443
LANL-20110756PRD4	Determining Physiological Predictors of Climate-driven Forest Mortality	\$53,244
LANL-20110757PRD4	Data Mining for the M-Sigma Relation	\$51,648
LANL-20110758PRD4	Technological Development of Green Cements by Combining Total Scattering and Advanced Multiscale Simulations	\$174,967
LANL-20110759PRD4	Controlled Synthesis and SERS Responses of Metal Nanostructures with Complex Morphologies	\$115,123
LANL-20120003DR	Energy Storage	\$1,903,782
LANL-20120007DR	Dynamic Earthquake Triggering, Granular Physics and Earthquake Forecasting: Determining the Physical Controls	\$774,634
LANL-20120011DR	TeV Jets: Nature's Particle Accelerators	\$1,668,455
LANL-20120019DR	Organic Electronic Materials: Designing and Creating Functional Interfaces	\$1,530,110
LANL-20120024DR	Plutonium-242: A National Resource for the Fundamental Understanding of 5f Electrons	\$1,688,580
LANL-20120029DR	Genetically Encoded Materials: Libraries of Stimuli-responsive Polymers	\$1,597,793
LANL-20120036DR	IMPACT: Integrated Modeling of Perturbations in Atmospheres for Conjunction Tracking - A New Orbital Dynamics and Drag Model to Avoid Collisions in Space	\$1,602,546
LANL-20120047ER	Next Generation Earth Models	\$366,365



LANL-20120053ER	Developing Potentials for Atomistic Modeling of Defect Phenomena at Metal-Ceramic Interfaces	\$354,400
LANL-20120068DR	Predicting Climate Impacts and Feedbacks in the Terrestrial Arctic	\$1,614,458
LANL-20120072DR	Hydrodynamical Mix Studies at the National Ignition Facility (U)	\$1,681,382
LANL-20120077DR	Advancing the Fundamental Understanding of Fission (U)	\$1,572,775
LANL-20120101DR	Physics Beyond the Standard Model with the Long-Baseline Neutrino Experiment	\$1,458,853
LANL-20120103DR	Hierarchical Sparse Models for Robust Analysis of Video Data.	\$1,744,493
LANL-20120116ER	A Time Reversal Non Contact Acoustical Source for NEWS (Nonlinear Elastic Wave Spectroscopy)	\$399,566
LANL-20120123ER	Uncertainty Quantification for Networks	\$387,767
LANL-20120149ER	Non-Equilibrium Fluctuation-Induced Interactions	\$383,463
LANL-20120153ER	Petascale Kinetic Plasma Simulation of the Interaction Among Laser Speckles in Nonlinear Optical Systems	\$396,324
LANL-20120166DR	Elucidating Humankind's Evolving Environment: From the Earth's Core to the Cosmos	\$1,678,916
LANL-20120167DR	Modern Challenges in Actinide Science	\$1,281,468
LANL-20120168DR	Quantum Science: From Information to Materials	\$378,373
LANL-20120190ER	Multiscale Spacecraft Charging Simulations in Support of New Space Missions	\$377,254
LANL-20120197ER	From Waste to Fuels and Feedstocks: Reduction of CO2 Using Main-Group Catalysts	\$304,915
LANL-20120200ER	Laboratory Study of Cosmically-Relevant Collisionless Shocks	\$488,044
LANL-20120206ER	Separation of Time Scales at High Latitudes: Fundamental Science and Numerical Method Development	\$329,174
LANL-20120218ER	Nuclear Quadrupole Resonance: From no Field to Ultra-Low Field	\$396,515
LANL-20120227ER	Time-gated Super Resolution Imaging	\$355,090
LANL-20120232ER	First Principles Many-Body Approaches to Strongly Correlated Actinide Metals	\$351,667
LANL-20120246ER	Lanthanum Bromide Glass Ceramics for Gamma-Ray Spectroscopy	\$357,979
LANL-20120247ER	Measurement of Pressure and Temperature in Thermal Explosions	\$373,314
LANL-20120250ER	Are Nanoscale Foams Radiations Resistant?	\$408,836
LANL-20120255ER	A Novel Mo-99 Separation Process Designed for Next Generation Medical Isotope Production	\$486,916
LANL-20120256ER	Biofuel Enzymes by Design	\$357,778

LANL-20120259ER	Laser-Driven Relativistic Mechanics, Radiation, and Ion Acceleration	\$431,388
LANL-20120266ER	Monte Carlo for Quantum Transport	\$423,706
LANL-20120278ER	Ultrafast Spectro-microscopy for Nanoscale Magnetic Domain Imaging	\$502,921
LANL-20120285ER	High-Energy Segregated Fuel-Oxidizer Solid Rocket Propulsion System	\$309,005
LANL-20120293ER	Majorana Neutrinos	\$605,701
LANL-20120300ER	Unlocking Plasmons in Graphene	\$389,510
LANL-20120314ER	Probing BSM Discoveries at the Large Hadron Collider	\$319,341
LANL-20120330ER	Plasmon-Exciton Interactions in Single-Wall Carbon Nanotube – Metal Nanostructure Complexes	\$434,059
LANL-20120340ER	Nonequilibrium Spin Noise in Semiconductors: Physics and Applications	\$381,318
LANL-20120355ER	Schrödinger Kinks: Quantum Coherence and Decoherence in Many-Body Systems	\$321,619
LANL-20120365ER	Novel Inverted Nanoshells for Multimodal Diagnostic Imaging and Cancer Therapy	\$436,670
LANL-20120374ER	Flipping the (light) Switch on Nano-magnetism: Emergent Photomagnetization in Quantum-confined Semiconductors	\$372,966
LANL-20120375ER	A Novel Exploration of Nature's Largest Explosions	\$507,949
LANL-20120395ER	Transport by Thermodynamic Cross-terms in ICF Capsule Plasmas	\$377,871
LANL-20120399ER	Co-Evolution of Protoplanets and Transitional Protoplanetary Disks - Pathway to Giant Exoplanet Formation	\$449,774
LANL-20120400ER	Metabolic Engineering of an Algal Lipid Bioswitch	\$339,376
LANL-20120443ER	Phylogenetic Classification and Analysis of Computer Malware	\$386,999
LANL-20120449ER	A New Class of Antibody-like Molecules that Signal upon Binding	\$462,694
LANL-20120459ER	Forensic Archaeology of a Manhattan Project Era Nuclear Site	\$382,129
LANL-20120460ER	Spatial and Wavelength-diversity Lasercomm System	\$368,860
LANL-20120464ER	Exploiting Metal/Organic Interfaces as Potential Bulk Heterojunctions: Unlocking the Efficiency of Organic Photovoltaics	\$372,794
LANL-20120469ER	Combinatorial Approaches To Graphical Models: Theory & Applications	\$378,751
LANL-20120502ECR	Advanced Materials for Exploring New Electronic and Optical Behaviors in Single-Walled Carbon Nanotube Systems	\$245,143
LANL-20120510ECR	Valence, Coordination and Reactivity at Interfaces	\$227,206

LANL-20120516ECR	Plasmas of Magnetic Monopoles in Artificial Spin Ice: Designing Frustration, Engineering Magnetricity.	\$222,145
LANL-20120522ECR	Gating and Emission Enhancement of Diamond Field-Emitter Arrays	\$167,838
LANL-20120525ECR	Valence-Fluctuation-Mediated Superconductivity in Heavy-Fermion Materials	\$210,198
LANL-20120530ECR	The Dynamic Environment of Iron Core Formation and Collapse	\$187,992
LANL-20120535ER	Energy Efficient, Inducible Harvesting of Microalgae for Biofuels Production	\$592,241
LANL-20120549ER	Real Time Imaging and Tomography of Solidification at Temperature Extremes	\$290,164
LANL-20120551ER	Extending 3-D Microstructural Quantification to Nuclear Reactor Mate-rials: Irradiation Damage and Structural Evolution under Extreme Envi-ronments	\$248,487
LANL-20120555ER	Controlling Complex Materials Functionality by Three-dimensional Defect Landscaping	\$239,121
LANL-20120581ER	Wavelength Dispersive Gamma Ray Spectrometer for Nuclear Safeguards	\$195,282
LANL-20120591ER	Shock Experiments at the Linac Coherent Light Source-Matter in Extreme Conditions	\$241,874
LANL-20120603ER	Advanced High Temperature Superconducting Undulators for Future X-ray Free Electron Laser	\$235,293
LANL-20120627ER	Plutonium Separations in Microreactors (U)	\$241,797
LANL-20120636ER	Sulfur Tolerant Polymeric/Metallic Hybrid Membranes for Hydrogen Separations	\$104,021
LANL-20120638ER	Internet and Cloud Security Anchored in Innovative, Random Number Hardware	\$186,929
LANL-20120649ER	Active Vibration Control for Mechanically-Cooled Germanium Detectors	\$105,460
LANL-20120662ER	Sensors to Servers: Self-healing Systems through State Awareness.	\$83,300
LANL-20120665ER	Engineering Next-generation Tactical Surveillance	\$159,271
LANL-20120675ER	Hyperbaric Laser Chemical Vapor Deposition of Functional Nano-scale Materials and Systems (U)	\$201,954
LANL-20120678ER	Energy-Aware Processing at the Sensor	\$98,917
LANL-20120707DR	Accelerating Materials Certification through Co-Design	\$921,775
LANL-20120708ER	Combining Information Theory and Game Theory	\$255,030
LANL-20120715ECR	Understanding Energetic Ion Transport and Loss in Natural and Artificial Radiation Belts at Low Altitudes	\$110,066
LANL-20120716ECR	Construction and Functionalization of Novel Biomimetic Human Liver	\$49,840

LANL-20120721ECR	Enabling Temporal & Spatial Shaping of Ultra-Intense Laser Pulses for Next-Generation, Compact Particle and Radiation Sources	\$117,964
LANL-20120732PRD1	Fabrication of an All-Carbon Solar Cell	\$82,731
LANL-20120733PRD1	Modeling X-ray Bursts	\$118,217
LANL-20120736ECR	Investigating the Itinerant to Localized Crossover of the 5f Electrons in Plutonium Alloys and Compounds	\$112,063
LANL-20120737PRD1	Non-equilibrium Transport in Nanoscale Thermal Energy Harvesting	\$71,884
LANL-20120738ECR	Deterministically Enhanced Monte Carlo for Radiative Transfer	\$98,135
LANL-20120745ER	Development of Methods and Synthetic Datasets for Classifying and Comparing Signatures in Metagenomic Sequence Data	\$49,935
LANL-20120746PRD1	High Efficiency Upconversion of Infrared Radiation in Semiconductor-metal Nanostructures for Applications in Solar Energy	\$52,453
LANL-20120747PRD1	Minority carrier devices based on concentric nanowires: Theory and Experiment	\$87,105
LANL-20120748ER	Hyperspectral Intensity Correlation Interferometry	\$146,248
LANL-20120749PRD2	Developing a Materials Strategy for d-electron Heavy Fermion Systems	\$72,571
LANL-20120750PRD2	Chemically Modifying the Uranyl Ion	\$123,578
LANL-20120751PRD2	Frustrated Materials	\$55,834
LANL-20120752PRD2	Cyber Security of the Smart Grid	\$97,211
LANL-20120753PRD2	Designing and Probing Novel Materials by Pressure Tuning of Nanocrystals	\$87,185
LANL-20120754PRD2	Atomic Coherence with X-Ray Free-Electron Lasers	\$60,056
LANL-20120755PRD2	Precision Fission Cross Section Measurements with a Time Projection Chamber (TPC)	\$97,401
LANL-20120756PRD2	The Assembly of Primeval Galaxies and the Birth of the First Quasars	\$15,622
LANL-20120758ECR	Large-Scale Simulations for Nuclei and Strongly-Correlated Matter	\$81,180
LANL-20120759ECR	Precision Predictions for Jet Cross Sections	\$81,711
LANL-20120760PRD2	Experimental and Computational Studies of Engineered Nanoparticle Aggregation in Human Tissue Models	\$79,854
LANL-20120761ER	Chemical Vapor Deposition of Structural Materials for Nuclear Reactor Applications	\$140,580
LANL-20120762ER	New Chemotypes of Novel Antibiotics And Their Mode of Action	\$74,784
LANL-20120763PRD2	Quantum and Correlation Effects in High-Energy Density Plasmas.	\$41,961

LANL-20120764ER	A Small Self-Regulating Fission Reactor System to Enable Space Science Missions	\$268,349
LANL-20120765PRD3	Functional Soft Materials by Assembling Metallo-Biopolymers	\$48,319
LANL-20120766PRD3	nTuned Optical Properties of Low-Dimensional Carbon Nanomaterials for Energy Harvesting	\$29,498
LANL-20120767PRD3	Edge Traffic Monitoring in Computer Networks	\$28,296
LANL-20120770PRD3	Nanoscope Recrystallization Dynamics and Phase Behavior in Liquid Crystals and Polymers	\$24,937
<b>Total # of Projects for LANL: 293</b>		
<b>Total Cost for LANL: \$142,197,701</b>		
<b>Total Administrative Cost \$2,594,253</b>		
<b>LBNL - L. Berkeley National Lab</b>		
LB10001	Enabling High Performance Computing (HPC) Workflows on Clouds	\$150,132
LB10005	Bolometric Detectors for the Neutrinoless Double-Beta Decay Experiments	\$169,645
LB10006	Metafluxomics of a phosphorus removing microbial community	\$112,882
LB10009	Long-range Ordering of Block Copolymers on Patterned Silicon	\$135,820
LB10010	Predictive High-Throughput Assembly of Synthetic Biological Systems: From Gene Expression to Carbon Sequestration	\$245,210
LB10012	Ion Beam Driven Fusion and Fusion-Fission Hybrids	\$105,989
LB10013	Identification of genetic networks controlling susceptibility to radiation-induced carcinogenesis	\$361,986
LB10014	The Nanoscale Surveyor	\$215,683
LB10017	CO2 as Cushion Gas for Compressed Air Energy Storage in Subsurface Reservoirs	\$134,832
LB10022	Biological Carbon Sequestration: Fundamental Research on Biological Carbon Capture and Soil Carbon Stabilization	\$409,665
LB10023	Ambient pressure photoemission spectromicroscopy	\$150,778
LB10026	Test monochromator/spectrometer systems with prototype high density gratings for high resolution x-ray scattering	\$218,858
LB10029	Computational Techniques for Non-crystalline Diffraction Imaging	\$145,587
LB10031	Novel Accelerator and Engineering Strategies for Ion Beam Cancer Therapy	\$170,866
LB10033	Enhanced Subsurface Fluid Characterization Using Joint Hydrological and Geophysical Data Inversion	\$150,866

LB10035	Multinozzle Arrays for Single Cell Metabolomics	\$174,000
LB10036	Surface-Selective Synthesis of Graphene Nanoribbons on Nanowire Templates	\$156,743
LB10044	Toward a US Greenhouse Gas Information System	\$177,826
LB11001	Direct determination of electrostatic interactions through advanced analysis of high-resolution macromolecular crystal data	\$97,427
LB11003	Fiber System Development for Surveys of Baryon Acoustic Oscillations (BAO) Applicable to the Future BigBOSS Experiment.	\$177,399
LB11004	Scientific Tools in Multi-Dimensional X-ray Spectroscopy and Coherent Diffractive Imaging	\$332,000
LB11007	Effect of Secondary Mineral Coatings on Biogeochemical Processes	\$263,516
LB11009	Assembly and Function of Organelles for Carbon Fixation	\$131,185
LB11010	Lattice QCD Codes by Discretizing Time and Space	\$344,531
LB11011	CYANOALKANES: Engineering Cyanobacteria for Phototrophic Production of Jet Fuel	\$339,519
LB11013	Attosecond XUV Condensed-Matter Science: Electronic Wavefunction Coherence and Correlated Dynamics	\$177,599
LB11014	Ultrafast 2D Fourier-Transform Spectroscopy of Electronic Dynamics in Photovoltaic Nanomaterials	\$158,727
LB11015	Identification and analysis of proteins that regulate the dynamic response of heterochromatin to radiation	\$159,994
LB11016	Effects of low dose radiation on communities of epithelial cells as a function of age.	\$268,819
LB11017	Piezoelectric Biomaterials for Novel Energy Conversion	\$110,630
LB11018	Next Generation Computing for X-Ray Science	\$291,621
LB11019	Probing the Partonic Structure of Protons and Nuclei with isolated direct photons at the LHC	\$223,930
LB11020	New opportunities in Hard X-ray Tomography - High Temperature and Elemental Imaging	\$184,930
LB11021	Developing analytical and communications frameworks to enable breakthrough low-carbon technologies	\$917,900
LB11022	Life-Cycle Analysis of Geologic Carbon Sequestration	\$256,819
LB11023	Mapping Genes to Salty Acres: Engineering Switchgrass Lines for Large-scale Biofuel Production on Marginal Lands	\$223,874
LB11024	From Fossil Fuel to Photovoltaics: Economic and Environmental/Health Impacts for Policy Considerations	\$295,914
LB11025	The Lyman Alpha Forest Cosmology Simulator (Nyx)	\$204,758
LB11026	Probing and Controlling Spin and Charge in Strong Spin-Orbit Materials	\$180,198

LB11027	Accelerated Materials Design through First-Principles Calculations and Data Mining.	\$150,714
LB11030	Highly Parallelized Synthesis of Microbial Genes Using Oligonucleotide Arrays	\$130,047
LB11032	Dynamic Light Redirection by Optical Metamaterial Coatings	\$355,996
LB11033	Enabling Structural Systems Biology at NGLS	\$408,986
LB11034	Testing a New Soil Carbon Sequestration Strategy by Accelerating Calcite Precipitation in Soils	\$220,998
LB11035	Experimental realization of a high-harmonics-seeded, laser-plasma-accelerator driven free-electron laser	\$390,782
LB11036	Transcriptome Analysis of Agave, a Candidate Biofuel Feedstock for Semi-Arid Climates	\$141,748
LB11038	High voltage up- and down-converters for low power low density detector instrumentation	\$324,616
LB11039	Soft X-ray Spectroscopy of Lithium-ions and Electrons for Li-ion Batteries	\$178,360
LB11040	Development of Environmental Cell with Local Temperature Control	\$235,659
LB11041	Collaboration with China on Geologic Carbon Sequestration: Novel Field Tests to Characterize Heterogeneity for Chinas First Pilot Test	\$144,893
LB11042	Development and feasibility of Fluctuation X-ray Scattering at the NGLS	\$287,647
LB11043	Defining an Ecosystem to Support Data -Intensive Science	\$301,493
LB11044	Interactions among Cloud Processes, Convection, and Climate Change	\$286,000
LB11045	Modeling desert soil crust microbial community response to pulsed climate events.	\$409,688
LB12001	Global transcriptome, deletome and proteome profiling of yeast exposed to radioactive metal ions: a tool to distinguish radiation-induced damage from chemical-toxicity.	\$223,444
LB12003	Novel laser-plasma storage ring for synchrotron radiation and particle physics applications	\$149,919
LB12004	Developing a mechanistic high-latitude soil carbon and nitrogen cycle model in TOUGHREACT	\$189,984
LB12005	High-throughput isolation and functional screening (HIFS) of microbes relevant to today's carbon cycling and bioenergy needs	\$107,014
LB12006	Photo-switchable Metal Organic Frameworks for CO2 Sequestration	\$175,771

LB12007	Soft X-Ray Spectroscopy for In-situ Electronic Structure Study of Artificial Photosynthesis	\$135,022
LB12008	Measuring Vertical Profiles of Atmospheric Pollutants using High Altitude Meteorological Balloons	\$139,831
LB12009	An Optimization-based Strategy for Computational Design of Nanoporous Carbon-Zero Materials	\$161,942
LB12010	Elementary Organometallic Reactions in a Protein Matrix	\$205,447
LB12012	Simulating Astrophysical Explosions through High Performance Computing	\$225,019
LB12013	4D Biology and Optogenetics of Microbial Biofilms	\$191,755
LB12014	Engineering of a positive feedback loop to improve wax deposition and plant water use efficiency	\$183,533
LB12015	Revolutionizing genome sequencing of uncultured microorganisms: Development of a high-throughput pipeline for targeted single-cell genome amplification	\$107,898
LB12016	Multiplexed control of opto-genetic actuators	\$206,414
LB12017	Computational, data management and analysis methods for the study of a rapidly expanding genome and metagenome sequence data space	\$287,413
LB12018	Lensless x-ray imaging of orbital order Bragg plane	\$171,844
LB12019	Electron Microscopy With Vortex Beams Carrying Orbital Angular Momentum	\$119,605
LB12020	Developing f-electron Soft X-ray Spectroscopy Simulation, Theory, and Experiment for Clean Energy Materials	\$357,658
LB12021	Quantitative Image Analysis for Computational Modeling	\$143,811
LB12022	Grazing Incident Soft X-ray Scattering for Organic Photovoltaics	\$133,978
LB12023	Combining machine learning and high performance computing to discover novel enzymes	\$190,348
LB12024	Computational Algorithms and Mathematical Software Tools for Material Science and Chemistry	\$202,521
LB12025	Spectroscopy and Microscopy Near Electrified Interfaces	\$274,421
LB12026	Low Cost Aqueous Sodium Ion Cells for Grid Applications	\$174,791
LB12027	Principles of Context-Controlled Standardized Biological Parts for Predictable and Rapid Assembly of New Biological Function.	\$352,657
LB12028	Exploiting Nanowire Surface States for Solar-Spectrum-Matched Plasmon-Enhanced Water Splitting	\$228,183
LB12029	A Multi-Investigator Approach Towards Chemoenzymatic Catalysis	\$221,852
LB12030	Oxidative Transformations of Organic Aerosol	\$164,754
LB12031	Electrically Created Fuels	\$138,188



LB12032	Ultrafast Spin and Magnetization Dynamics in Nanoscale Magnetic Structures	\$156,548
LB12033	Template Assisted Assembly of Monodisperse Discotic Phases as Highly Tunable Electronic Materials	\$131,696
LB12034	Computational Methods for Photosystem II Structure Probed by X-ray Free-Electron Laser Studies	\$112,387
LB12035	Interlinkage of Cross-Disciplinary Mathematical Technologies	\$521,148
LB12036	LPAR: Low-Power Architecture Research for Exascale Computing	\$180,231
LB12037	Antihydrogen Research to Advance Studies in Matter-Antimatter Asymmetry	\$257,163
LB12038	Free Electron Laser Soft X-ray Self-Seeding	\$255,944
LB12039	Low energy, low cost refrigerators for vaccine delivery	\$73,911
LB12040	New Monolithic CMOS Sensors on a Fully Isolated Substrate	\$43,947
<b>Total # of Projects for LBNL: 92</b>		
<b>Total Cost for LBNL: \$19,994,277</b>		
<b>Administrative Cost Paid by Laboratory Overhead</b>		
<b>LLNL - L. Livermore National Lab</b>		
10-ERD-004	Mix at the Atomic Scale	\$606,300
10-ERD-020	Genomics of Cell-Cell Communication: Identification of DNA Sensors in Humans	\$454,090
10-ERD-021	Microbes and Minerals: Imaging Carbon Stabilization	\$501,220
10-ERD-025	Parallel Discrete-Event Simulation of Cyber Attack and Defense Scenarios and Automated Rollback Code Generation	\$575,990
10-ERD-026	High-Gradient Inverse Free-Electron Laser Accelerator	\$496,100
10-ERD-027	CgWind: A Parallel, High-Order Accurate Simulation Tool for Wind Turbines and Wind Farms	\$476,910
10-ERD-029	Modeling and Measuring Quark-Gluon Plasma Shock Waves	\$207,910
10-ERD-033	Unlocking the Universe with High-Performance Computing	\$341,970
10-ERD-035	Design of Novel Catalysts to Capture Carbon Dioxide	\$563,120
10-ERD-038	Discovery and Synthesis of Materials for High-Energy-Density Science	\$215,460
10-ERD-039	Binary Analysis	\$418,900
10-ERD-040	Uncertainty Visualization	\$332,280
10-ERD-043	Embedded Sensors for Monitoring Complex Systems	\$749,820
10-ERD-044	An Intense Laser-Based Positron Source	\$321,990

10-ERD-053	Direct Observation of Phase Transformations and Twinning Under Extreme Conditions: In Situ Measurements at the Crystal Scale	\$601,320
10-ERD-054	Eigensolvers for Large-Scale Graph Problems	\$597,240
10-ERD-055	Prediction of Underground Coal Gasification Cavity Growth, Coal Conversion, and Geophysical Signatures	\$832,140
10-ERD-056	Material-Coolant Interactions in Fusion Reactors	\$800,570
10-ERD-057	Multiscale Polymer Flows and Drag Reduction	\$273,000
10-ERD-058	Fundamental Research in Advanced Quantum Simulation Algorithms	\$278,440
10-ERD-060	Enhancing Climate Model Diagnosis and Intercomparison	\$494,920
10-LW-033	Establishing Cancer Stem Cell Longevity and Metastatic Potential	\$102,830
10-LW-045	In Situ Spectroscopy and Microscopy for the Study of Advanced Materials for Energy Storage	\$104,630
10-SI-006	Science and Technology of Unconventional Fiber Waveguides for Emerging Laser Missions	\$1,654,770
10-SI-007	Real-Time Space Situational Awareness	\$2,976,870
10-SI-009	Dynamic Chamber Processes for LIFE: Simulations and Experiments on Beam Propagation and Chamber Clearing	\$1,439,290
10-SI-010	Compact, Efficient Lasers for Inertial Fusion-Fission Energy	\$2,052,740
10-SI-013	The Advance of Uncertainty Quantification Science	\$2,429,980
10-SI-014	ExaCT: Exascale Computing Technologies	\$1,678,100
10-SI-015	Advanced Rare-Event Detectors for Nuclear Science and Security	\$1,733,720
10-SI-016	Nuclear Forensics: An Integrated Approach for Rapid Response	\$1,773,410
11-ERD-006	Detection and Attribution of Regional Climate Change with a Focus on the Precursors of Droughts	\$199,020
11-ERD-008	Unifying Memory and Storage with Persistent Random-Access Hardware	\$419,250
11-ERD-011	Fundamental Chemical Behavior of Superheavy Elements through Applications of Online Isotope Production and Automated Chemical Systems	\$460,610
11-ERD-012	A Rapid Response System for Toxin Removal	\$355,020
11-ERD-015	Coherence-Preserving X-Ray Adaptive Optics	\$735,140
11-ERD-016	Innate Immunity for Biodefense: Targeted Immune-Modulation to Counter Emerging Threats	\$896,020
11-ERD-017	Advanced Algorithm Technology for Exascale Multiphysics Simulation	\$1,226,780
11-ERD-022	Compressive Sensing for Wide-Area Surveillance	\$362,920

11-ERD-023	Modeling of Microstructural Processes in Tungsten-Based Alloys for Fusion Applications	\$487,380
11-ERD-026	Chemical-Vapor-Modified Laser-Based Damage Mitigation and Surface Shaping of Fused Silica	\$1,585,450
11-ERD-027	Unraveling of Assembly and Structure-Function Relationships of Poxviruses	\$224,360
11-ERD-028	Data Abstractions for Portable High-Performance Computing	\$477,650
11-ERD-030	Understanding the Stochastic Nature of Laser-Induced Damage	\$1,626,950
11-ERD-033	Temperature-Dependent Lattice Dynamics and Stabilization of High-Temperature Phases from First-Principles Theory	\$401,760
11-ERD-035	Adaptive Sampling Theory for Very-High-Throughput Data Streams	\$358,630
11-ERD-036	Fundamentals of Figure Control and Fracture-Free Finishing for High-Aspect-Ratio Laser Optics	\$1,649,360
11-ERD-037	Rapid Development and Generation of Affinity Reagents for Emerging Host-Pathogen Interactions	\$394,390
11-ERD-039	Hydrogen Melting and Metallization at High Density	\$346,340
11-ERD-044	Quantification of Carbon-14 by Optical Spectrometry	\$357,600
11-ERD-046	Pressure-Induced Melt, Nucleation, and Growth: Fundamental Science and Novel Technological Materials	\$458,410
11-ERD-048	Images and Spectra of Extrasolar Planets from Advanced Adaptive Optics	\$490,790
11-ERD-050	Dynamics of Ultrafast Heated Matter	\$502,790
11-ERD-051	Development of an Approach to Imaging for Use in a Verification Regime	\$399,850
11-ERD-052	Ultrafast, Sensitive Optical Radiation Gamma, Neutron, and Proton Detector Development	\$896,190
11-ERD-053	Land-Use Impacts on Belowground Carbon Turnover and Ecosystem Carbon Dioxide Source Attribution Using Radiocarbon	\$408,910
11-ERD-054	Astrophysical Collision-less Shock Generation by Laser-Driven Laboratory Experiments	\$265,680
11-ERD-058	Control of Impulsive Heat Loads in Tokamaks: Measurements and Modeling	\$540,220
11-ERD-060	Targeted Drug Delivery for Treating Traumatic Bone Injury	\$477,860
11-ERD-061	Resonantly Detected Photo-Acoustic Raman Spectroscopy as a New Analytical Method and Micro-Volume Probe	\$257,880
11-ERD-063	Investigation of Fast Z-Pinches for Scalable, Large-Current High-Gradient Particle Accelerators	\$536,460

11-ERD-066	Accelerator and Secondary-Ion Mass Spectrometry for Analysis of Coastal Carbon Flux	\$364,050
11-ERD-067	Detonation Performance of Improvised Explosives via Reactive Flow Simulations and Diamond Anvil Experiments	\$336,990
11-ERD-069	Nuclear Plasma Physics	\$510,020
11-ERD-073	Ab Initio Study of the Water-Semiconductor Interface for Photo-Electrochemical Hydrogen Production	\$266,560
11-ERD-075	The Role of Plasma Electromagnetic Fields in Anomalous Mass Diffusion: Applications to High-Energy-Density Science	\$408,080
11-ERD-076	Large-Scale Energy System Models: Optimization Under Uncertainty	\$1,367,630
11-FS-003	Structure and Bonding in Carbon under Extreme Conditions	\$73,130
11-FS-004	Core-Collapse Supernova Explosions Mechanism Studies	\$73,130
11-FS-005	Next-Generation Tunable Targets for Laser-Compression Experiments	\$69,270
11-FS-006	Development of a New Materials Platform to Study Diamond and Iron at Ultrahigh	\$73,130
11-FS-007	Dynamics of the Eagle Nebula	\$68,560
11-FS-008	Relativistic Plasma Physics at the National Ignition Facility	\$62,270
11-FS-009	Collision-less Shock Experiments at the National Ignition Facility	\$83,570
11-FS-012	High-Resolution K-Shell X-Ray Spectroscopy	\$41,800
11-FS-014	Demonstrating Precision Delayed-Neutron Spectroscopy Using Trapped Radioactive Ions	\$71,950
11-LW-003	Structure-Property Relationships in Ferropnictide Superconductors at Extreme Pressures	\$268,140
11-LW-008	Demonstration of Electron Spin Imbalance in Two-Dimensional States	\$269,350
11-LW-009	Computational Studies of Blast-Induced Traumatic Brain Injury Using High-Fidelity Models	\$247,900
11-LW-015	In Vivo Modulation of MicroRNA for Cancer Therapy	\$267,670
11-LW-018	Prenatal Exposure to Endocrine-Disrupting Compounds Found in the Water Supply	\$257,190
11-LW-019	Development of an Economically Viable Biological-Hydrogen Production System	\$134,050
11-LW-028	Fundamental Properties of Diamondoids	\$266,420
11-LW-037	Mass Transport through Porous Materials	\$280,630
11-LW-039	Protist Power: Deconstructing Termite Conversion of Wood to Biofuels	\$208,450

11-LW-042	Non-Acoustic Secure Speaker Verification in High-Noise Environments	\$226,740
11-LW-054	Solar-Powered Microbial Electrolysis Cells for Hydrogen Production	\$273,120
11-SI-002	Advanced Inertial-Fusion Target Designs and Experiments for Transformative Energy Applications	\$1,326,530
11-SI-004	Target Components for Ensuring Survival During Flight into a Laser Inertial-Fusion Reaction Chamber	\$1,280,780
11-SI-005	Scalable High-Volume Micro-Manufacturing Techniques for Three-Dimensional Mesoscale Components	\$2,130,440
11-SI-006	Creating Optimal Fracture Networks for Energy Extraction	\$1,879,270
12-ERD-005	Asteroid Deflection	\$678,500
12-ERD-013	Novel Rare-Earth-Based Permanent Magnets	\$634,530
12-ERD-016	Secure Virtual Network Enclaves	\$183,110
12-ERD-020	First-Principles Materials Characterization and Optimization for Ultralow-Noise Superconducting Qubits	\$243,200
12-ERD-021	Probing Atomic-Scale Transient Phenomena Using High-Intensity X-Rays	\$383,750
12-ERD-022	Computational Gyro-Landau Fluid Model for Tokamak Edge Plasmas	\$490,880
12-ERD-023	High-Fluence, Multi-Pulse Laser Surface Damage: Absorbers, Mechanisms, and Mitigation	\$1,555,900
12-ERD-024	NetSim and Its Applications	\$990,630
12-ERD-026	An Open Framework to Explore Node-Level Programming Models for Exascale Architectures	\$205,380
12-ERD-027	A Scalable Topological Quantum Device	\$209,570
12-ERD-029	Adaptive Model Reduction for High-Fidelity Simulations	\$18,240
12-ERD-030	High-Order Curvilinear Arbitrary Lagrangian-Eulerian Hydrodynamics	\$729,560
12-ERD-031	Molecular Movies with Dynamical Imaging of Biomolecular Interactions	\$973,080
12-ERD-032	Hydrogen Ice Layers for Inertial-Confinement Fusion Targets	\$1,225,730
12-ERD-033	Efficient and Accurate Metagenomics Search Using a k-mer Index Stored in Persistent Memory	\$492,440
12-ERD-035	Dynamically Tunable Nanomaterials: From Atomic-Scale Processes to Macroscopic Properties	\$456,420
12-ERD-038	Automatic Complexity Reduction with Application to Electromagnetic Effects Simulation	\$162,740
12-ERD-040	Novel Multi-Gigahertz Electron Beams for Advanced X-Ray and Gamma-Ray Light Sources	\$1,694,240
12-ERD-041	Kathleen Schaffers, Principal Investigator	\$1,028,630
12-ERD-042	Strength in Metals at Ultrahigh Strain Rates	\$365,830

12-ERD-043	A New Approach for Reducing Uncertainty in Biospheric Carbon Dioxide Flux	\$267,730
12-ERD-046	Predicting Weapon Headspace Gas Atmosphere: Age-Aware Predictive Models of Weapon Component Compatibility	\$535,990
12-ERD-047	Model-Reduction Approach to Line-By-Line Calculations	\$359,950
12-ERD-048	Linearly Scalable Algorithm for First-Principles Molecular Dynamics at Exascale	\$351,480
12-ERD-049	Modulating Cellular Autophagy as an Alternative Line of Defense against Bacterial Pathogens	\$349,070
12-ERD-050	Laser Lethality Experimentation, Modeling, and Simulation Capability	\$801,920
12-ERD-051	Forward Path to Discovery at the Large Hadron Collider	\$227,690
12-ERD-052	Equation of State of Polymers under Extreme Conditions with Quantum Accuracy	\$416,110
12-ERD-053	Multi-Scale Capabilities for Exploring Transport Phenomena in Batteries	\$472,370
12-ERD-055	Multilayer Thin-Film Science for Core Missions	\$441,900
12-ERD-057	Compton-Scattering Optimization for Ultra-Narrowband Nuclear Photonics Applications	\$730,610
12-ERD-058	Early-Phase Hydrodynamic Instability Development in National Ignition Facility Capsules	\$351,290
12-ERD-060	The Next Generation of Gamma-Ray Sources: Dual Isotope Notch Observation	\$1,047,230
12-ERD-061	Theory and Simulation of Large-Amplitude Electron Plasma and Ion Acoustic Waves with an Innovative Vlasov Code	\$652,910
12-ERD-062	Pair Plasma Creation Using the National Ignition Facility	\$424,430
12-ERD-064	Predictive Models for Target Response during Penetration	\$430,730
12-ERD-065	Sub-Wavelength Plasmon Laser	\$681,330
12-ERD-066	New Energetic Materials	\$263,700
12-ERD-069	Forecasting and UQ of power from intermittent renewable energy sources	\$480,840
12-ERD-071	OPSEC AWARE	\$669,090
12-ERD-072	Determining the Coulomb Potential in Electronic Structure Calculations	\$146,070
12-ERD-073	Carbon Nanometer-Scale Membrane Channels	\$229,960
12-ERD-074	Applying High-Performance Computing and Simulation to Future Energy Challenges	\$292,080
12-ERD-076	The High Energy Density Science of Inertial Confinement Fusion Ignition	\$496,930

12-FS-002	Nonlinear Evolution of the Weibel Instability of Relativistic Electron Beams	\$73,140
12-FS-003	Recovering Large Volumes of Homogeneously Shocked Samples	\$73,130
12-FS-004	Imaging scattered x-ray radiation for density measurements in hydrodynamics experiments on the National Ignition Facility	\$73,120
12-FS-005	Concept Development for Astrophysically Relevant Turbulence on NIF	\$73,130
12-FS-006	Evaluating the feasibility of co-evolving network simulations	\$121,010
12-FS-007	Reduced-Order Modeling	\$99,250
12-FS-008	Visualization of Computer Networks at Arbitrary Scales	\$55,840
12-FS-009	Feasibility of Predicting Protein Antigenicity over Multiple Resolutions of Function	\$51,120
12-FS-010	In Vitro Chip-Based Human Brain Investigational Platform (iCHIP)	\$89,980
12-FS-011	Energy Harvesting to Power Autonomous Sensors	\$101,220
12-FS-012	High-Energy Beams for Simulating High-Yield Nuclear Events	\$14,540
12-FS-013	Optimizing Application Cache Performance	\$65,020
12-FS-014	Deep Penetration in Aerospace Composite Materials Using Near-Infrared Laser Radiation	\$99,750
12-LW-008	Comprehensive Study and Treatment of Major Depressive Disorder Using Electrical and Chemical Methods	\$265,960
12-LW-009	High-Precision Test of the Gravitational Inverse-Square Law with an Atom Interferometer	\$231,840
12-LW-014	Volume Collapse: Finger on the Pulse of the f Electrons	\$265,810
12-LW-026	Physics beyond Feynman	\$257,420
12-LW-030	Increasing the Lifetime of Rechargeable Batteries	\$252,370
12-LW-043	Super-Strained Three-Dimensional Semiconductors	\$247,370
12-SI-002	Materials for Inertial Fusion Energy Reactors	\$1,600,920
12-SI-004	Computational Advancements in Countermeasures for Emerging Bio-Threats	\$1,519,400
12-SI-005	Transport Properties of Dense Plasmas and a New Hybrid Simulation Technique for Matter at Extreme Conditions	\$1,947,670
12-SI-007	Extreme Compression Science	\$1,667,530
12-SI-008	Ultrahigh Burn-Up Nuclear Fuels	\$1,689,280
<b>Total # of Projects for LLNL: 159</b>		
<b>Total Cost for LLNL: \$91,852,110</b>		
<b>Total Administrative Cost \$2,268,440</b>		

NNSS - Nevada National Security Site		
H1702080	Radiation Hardened Wide-gap Semiconductor Detectors	\$8,879
J1701131	Back-Thinned Silicon Radiation Detector Readout	\$8,932
J1701142	Independently Triggerable Linear-Transformer Driver for Short, Multi-Pulse Radiography	\$221,965
J1701172	Passive Imaging of Warhead-like Configurations with Cosmic-Ray Muon Tracking Scanners	\$346,232
J1701181	Nanoscale Properties of Shocked Materials	\$70,032
J1701191	Ultrafast Electron Diffraction for Shock Physics Phase Transition Studies	\$20,327
J1701261	Spiral thermal neutron detector	\$14,705
J1701321	Passive Imaging of Warhead-like Configurations with Cosmic-Ray Muon Tracking Scanners	\$422
J1701322	Back-Thinned Silicon Radiation Detector Readout	\$161,920
J1701331	Advanced high-speed 16-bit digitizer system	\$18,418
J1701332	Advanced high-speed 16-bit digitizer system	\$162,174
J1701342	Pulse-Mode Spiral Neutron Detector	\$210,409
J1701372	Gamma Ray Spectrometer	\$131,180
J1701382	Electron Mobility Study in Scintillator Material	\$174,586
J1702012	Ultrafast High-Quantum Efficiency Microstructured Photocathodes for Advanced Sensors	\$270,556
J1702072	Radiation Hard AlGaN Imager and Electronics	\$299,202
J1702142	High-Efficiency Solid-State Thermal Neutron Detector and Imaging System	\$258,582
J1702511	Lightweight High Efficiency Thermal Neutron Detector	\$1,323
J1703212	Uncertainty estimation techniques for high-density 1-D mPDV imaging diagnostic	\$213,283
J1704031	Straw Detector - Dual Fission Meter for Gamma - Neutron multiplicity Measurements	\$4,857
J1704102	Electronic Veto and Software Partitioning of Cosmic Neutrons	\$171,630
J1705021	Photonic bandgap crystals for optical tagging, tracking and locating	\$3,874
J1705081	Three Dimensional Nanoparticle Enhancement of Scintillation	\$45
J1705082	Ejecta Transport Chemistry	\$258,900
J1705141	Improved understanding of windows for optical shock-wave diagnostics, Phase II	\$1,342
J1705171	Miniaturizing Time-of-Flight Mass Spectrometers	\$6,153
J1705182	Dynamic Conductivity of Shocked Materials	\$249,871
J1705291	Time-resolved Hyperspectral Fluorescence Spectroscopy using Frequency Modulated Excitation	\$216
J1705311	Time multiplexed emissivity and pyrometry	\$2,989



J1705412	Time-resolved Hyperspectral Fluorescence Spectroscopy using Frequency Modulated Excitation--Applications	\$242,558
J1705462	Enhanced Accuracy of Shock Arrival Using PDV / Heterodyne VISAR	\$192,825
J1705592	Wi-Fi Exploitation From An Embedded System	\$258,163
J1705622	Large Area Graphene PANI Neutron Detector	\$197,987
J1705692	Nanoparticle-based Analytical Biosensor	\$214,723
J1706012	New Hybrid TDMA/CSMA Wireless Mesh Networks (WMN) for Secure Smart Grid Communication	\$168,232
J1706042	Miniaturized Multi-Band Antenna Design via Element Colocation and Inductive Feed Loading	\$159,645
J1706182	Low Cost Cerium Bromide Alloys	\$226,038
J1706312	Cyber Microframework (CMF) with Custom IP Packet Substitution	\$281,313
J1706342	An Extensible Architecture for Supporting Next Generation Aerial Radiological Measurements	\$270,365
J170FS12	Fissile Material Based Neutron Detector Feasibility Study	\$27,556
<b>Total # of Projects for NNSS : 40</b>		
<b>Total Cost for NNSS : \$5,532,409</b>		
<b>Total Administrative Cost \$1,029,385</b>		
<b>NREL - National Renewable Energy Lab</b>		
6270901	Biodiesel from Cyanobacteria	\$68,132
6271001	Mapping Local Photocurrent in Excitonic Solar Cells with Nanometer Resolution	\$168,987
6271101	Investigation of Biomass Productivity and Lipid Content in Green Algae Constitutively Expressing a Novel Lipid-Producing Pathway	\$356,601
6271201	A Genetic Engineering Approach to Improve Flocculation of Green Algae for Biofuel Production	\$253,748
6271202	An Integrated Biohybrid Approach for Photocatalytic Production of Higher Alcohols	\$163,444
062C1201	High-Fidelity Computational Modeling of Wind-Turbine Structural Dynamics	\$170,435
6501101	Wind Turbine Array Fluid Dynamic and Aero-Elastic Simulations	\$313,582
6511001	Regulated Enzymatic Disruption of Algal Cell Walls for Enhanced Lipid Recovery	\$79,662
6511002	Identification of Novel Promoters to Facilitate Genetic Engineering of Algae for Enhanced Oil Production	\$79,900
6511003	Comprehensive Pyrolysis Oil and Pyrolysis Oil-Based Fuels Characterization Using 2-Dimensional GC/GC/MS	\$151,972

6511101	Computational and Experimental Design of Catalysts for Lignin Depolymerization	\$312,216
6511102	Developing Compositional Analysis Methods to Compare Microalgae-to-Biofuel Processes	\$342,055
6511201	Engineering Zymomonas mobilis for Anaerobic Production of Hydrocarbons from Lignocellulosic Biomass	\$339,534
6511202	Hydrocarbon and Coke Forming Reactions of Biomass Oxygenates on Zeolites and Hierarchical Zeolites	\$175,240
6511203	Low-Temperature High Selectivity Process for Gasoline Synthesis via Biomass Gasification	\$174,763
6521002	Advanced Thermal Materials for CSP	\$152,552
6521101	In-Line Sensor to Monitor CdS Thin Film Growth in Roll-to-Roll Manufacturing	\$73,608
6521201	Cu <sub>2</sub> ZnSn(S,Se) <sub>4</sub> Photovoltaic Devices Developed with Atomic Layer Deposition	\$292,331
6521202	Engineering Nanoionic Interfaces by PLD for Energy Conversion and Storage	\$136,858
6541101	Properties and Performance of Next Generation Biofuels	\$316,489
6541102	Improving Performance of Lithium-Ion Batteries Using Nanostructured Electrode	\$210,850
6541201	Life Monitoring and Control Technologies for Vehicle-and Grid-Integrated Energy Storage Systems	\$236,103
6551101	Building Occupant Agent (BOA)	\$163,350
6551201	Modeling and Experimental Studies of the Interfacial Effects of Confined and Suspended Nanoparticles	\$198,387
6551202	Towards Building Design Optimization under Uncertainty	\$267,542
6561101	Synthesis and Modeling of Shape-Anisotropic Nanomaterials Using Spontaneous Galvanic Displacement Reactions	\$218,948
6591002	Design Graphene Oxide Based Low Band Gap Absorber for OPV Applications	\$196,742
6591101	The Influence of Surface Plasmons on Excited State Evolution in Light Harvesting Chromophores	\$279,211
6591102	Synthesis of Uniform Graphene Based Materials with Controlled Electronic Structure for Catalyst and Photovoltaic Applications	\$227,519
6591103	Ionic Liquid Electrodeposition Process of Cu-Sn-Zn-S-Se Thin Films for Solar Cells	\$245,357
6591201	Direct Morphological and Compositional Control of Platinum Group Metal Thin-Film Catalysts by Atomic Layer Deposition	\$394,527

6591202	New Concept for Hot Carrier Solar Cell	\$181,454
6591203	Photomaterials by Design for Photoelectrochemical Water Splitting	\$266,720
6591204	Stretch Catalysis: Electrochemistry and Electrocatalysts of Stretched Transition Metal Complexes and Clusters	\$258,445
6641101	Assessing the Effects of Climate Change on Electricity Generations	\$239,969
6641102	Quantifying the Potential for Interruptible Load Capacity to Assist in Integration of Variable Resource Renewable Generation Technologies	\$35,842
6641201	Automated Analysis of Renewable Energy Datasets	\$209,400
6641202	Evaluating the Ability of Thermal Energy Storage to Enable Renewable Electricity Generation	\$64,083
6641203	Incorporating Water Resource(s) Availability as a Constraint for Modeling Energy Generation in Capacity Expansion Models	\$186,307
6641204	Campus Energy Models for Control and Performance Validation	\$189,129
6671201	Consumer Behavior Change in the Federal Fleet	\$148,518
06RF1001	Development of Novel Cyanobacterial Biofuels	\$194,491
06RF1002	Understanding the Properties of Intrinsic and Photo-Induced Charges in Molecular-Based Materials: Advancing Excitonic Solar Cells	\$327,857
06RF1201	Advancing Solar Photoconversion through a Study of Long-Range Energy Transfer	\$131,952
<b>Total # of Projects for NREL: 44</b>		
<b>Total Cost for NREL: \$9,194,812</b>		
<b>Total Administrative Cost \$181,441</b>		
<b>ORNL - Oak Ridge National Lab</b>		
5384	Scalable, fully implicit algorithms for first-principles kinetic simulations at the ultrascale	\$67,523
5388	Multiphase Self-Organized Interfaces for Polymer Photovoltaic Technologies	\$111,867
5404	The Search for Common Themes in Unconventional Superconductivity: Spin Excitations in Organic Superconductors	\$196,476
5424	Revolutionary Radiation Transport for Next-Generation Predictive Multi-Physics Modeling and Simulation	\$149,988
5432	The Search for Common Themes in Unconventional Superconductivity: Spin Excitations in Organic Superconductors	\$51,629
5445	In-situ Neutron scattering studies of Fuel Cell materials	\$21,424

5470	MEMS based pyroelectric thermal energy scavengers and coolers	\$34,488
5481	Novel Zeolitic Carbon Support for Catalytic Bioethanol Production	\$30,999
5484	Novel Nanostructured Photovoltaic Solar Cells	\$57,213
5487	Biological Signature Identification and Threat Evaluation System (BioSITES)	\$25,547
5501	Enabling plant systems biology investigations for carbon cycling and biosequestration research	\$18,550
5547	A Transformational, High Energy Density Secondary Aluminum Ion Battery	\$34,602
5551	Neutron Imaging of Fluids Within Plant-Soil-Groundwater Systems	\$61,667
5565	Engineered Chemical Nanomanufacturing of Quantum Dot Nanocrystals -- Meeting the Energy Technology Demands	\$59,999
5593	Power Flow Control Using Distributed Saturable Reactors	\$318,066
5594	Direct catalytic conversion of ethanol to hydrocarbons - a first principles theoretical and experimental study	\$299,004
5599	Portable Water Reclamation from Diesel Exhaust by Inorganic Membranes	\$323,754
5604	Novel Resistive Plate Avalanche Chamber for Neutron Detection	\$246,718
5606	Characterization and Modeling of Permafrost Microbial Community Diversity and Metabolism during Simulated Global Warming	\$350,148
5608	Fundamentals of ionic conductivity in polymeric materials for energy storage applications: How to decouple ionic motions from segmental dynamics	\$348,651
5623	Functionally Graded and Geometrically Ordered Titanium Composite Armor Materials	\$323,813
5630	Scalable and Efficient Infrastructure for Exascale Analysis and Visualization	\$313,909
5641	Advanced Bioprocessing for Sustainable Biorefinery Technology Development	\$344,669
5653	Ultrascale Algorithms for Verifying Security Properties of Compiled Software	\$197,360
5659	Real-Time Simulation of Power Grid Disruptions	\$725,385
5663	Nanoporous Inorganic Membranes for Selective Separations in High Temperature Flow-through Recycle Pretreatment of Lignocellulosic Biomass	\$310,179
5665	Distributed Computational Framework for Massive Heterogeneous Data Fusion	\$156,515

5684	Towards full first-principles simulations of correlated electron materials	\$299,947
5685	Modeling Long-term Population Resettlement under Climate Change Scenarios	\$252,312
5698	Quantum Lightwave Circuits	\$299,659
5699	Incorporating Molecular-Scale Mechanisms Stabilizing Soil Organic Carbon into Terrestrial Carbon Cycle Models	\$314,531
5714	Advanced Alloy Development for the Next Generation Liquid Fluoride Salt Cooled Nuclear Reactors	\$350,599
5716	Why coatings work: Nanoscale view of high voltage cathode surfaces	\$304,600
5740	Material Degradation Phenomena and Mitigation For Nuclear Energy Systems	\$298,113
5749	Hercules: A User Guided Translation Tool to Facilitate Application Porting to New Peta/Exascale Architectures	\$346,463
5767	Study of Gas Phase Separations for Closed and Modified Open Used Nuclear Fuel Reprocessing	\$321,698
5768	A Predictive Analysis Toolbox for Ultrascale Data Exploration	\$342,621
5770	Quantum Imaging by Compressive Sampling for Enhanced Surveillance and Real Time Monitoring	\$349,796
5777	Enhanced Directionally Selective Moderator for SNS	\$236,923
5801	Unraveling the molecular and biochemical basis of crassulacean acid metabolism (CAM) in Agave for sustainable biofuel production	\$459,273
5839	Motional Changes in Biomolecular Complexation	\$97,313
5842	Highly-Polar Oxides for Photovoltaics Beyond p-n Junctions	\$49,993
5843	Theoretical Studies of Decoupling Phenomena in Dynamics of Soft Materials	\$149,589
5868	Irradiation Effects in the Graphene-Based Electronics	\$9,017
5869	Modeling of the Plasma-Material Interface	\$29,450
5872	Can Neutrons Do It? Probing Performance of Li-Ion Batteries in-situ	\$26,150
5884	Drag Reduction with Superhydrophobic Surfaces	\$31,858
5893	Quantifying Economic Losses Associated with Climate Extremes under Conditions of Climatic and Socioeconomic Change	\$313,964
5898	Air Stable Fe-C Core-Shell Nanocomposite for Degradation of Chlorinated Solvents	\$42,108
5902	Design of Coaxial TiO <sub>2</sub> Nanotube Arrays for Solar Energy Utilization	\$107,276

5903	Decoder-Assisted Frame Synchronization for Orthogonal Frequency Division Multiplexing (OFDM)-Based Data Communications Systems	\$19,938
5905	Asynchronous Algorithms for Exascale Computations	\$59,334
5906	Development of a Novel Electron Dynamics Simulation	\$1,316
5908	Low Dimensional Multiferroicity	\$57,244
5910	Advanced Algorithms and User Interfaces for Personalized Data Mining of Biomedical Images and Literature	\$189,269
5911	Optical Characterization of Bacterial Dynamics in a Microfluidic Environment	\$187,538
5913	Studies of charge particle emitters at the limits of bound nuclei	\$213,891
5921	A fundamental investigation on the effects of high magnetic fields during the synthesis of iron-based type-II superconductors	\$29,074
5935	First-principles Calculations and Computational Thermodynamic Modeling on Zn-S and Sn-S to support Identifying Thermal Decomposition Pathways for...	\$743
5944	Turning Chalcopyrites Into Dilute Magnetic Topological Insulators (DMTI) via Magnetic Doping	\$84,137
5957	Separation of Carbon Dioxide from Flue Gases	\$95,861
5959	Direct Imaging of Energy Generation and Collection in Photovoltaic Nano-Materials: EBIC in the STEM	\$72,486
5960	Tuning the Chemical Reactivity of Metal Nanoparticle Aggregates by Actively Controlling their Electronic Coupling	\$101,445
5961	Boosting Organic Solar Cell Efficiency using Magnetism and Ferroelectricity	\$75,079
5962	CuInS <sub>2</sub> /ZnS Core/Shell Nanocrystals? A Designer Red Emitter to Revolutionize Solid-State Lighting Technology	\$59,984
5963	Addressable Nanopore Array: Multiscale Fluidic Interface to Cell Culture	\$113,759
5964	Microwave Activation for Advanced Catalytic Conversion of Biomass to Hydrocarbon Fuels and Chemical Feedstocks	\$36,531
5965	Thermopower at the Atomic Scale	\$44,188
5967	Transition-Metal Carbides As Ingredients for Active and Stable Bio-Oil Upgrading Catalysts	\$70,236
5968	Probing Oxygen Reduction/Evolution Reactions on the Nanoscale: Towards viable Li-air Batteries	\$119,446
5969	Authenticated Radio Frequency Identification	\$68,810
5971	Citizen Engagement for Energy Efficient Communities (CoNNect)	\$169,634

5977	Bacterial Iron and Uranium Redox Cycling in the Contaminated Subsurface	\$520,546
5978	Advance Technology for High-Current Electromagnetic Isotope Separation	\$165,554
5979	Light Water Reactor TRISO Particle-Metal-Matrix Composite	\$154,335
5980	Intelligent Advanced Propulsion Systems	\$147,156
5981	Algorithmic Challenges in Computational Science on the Path from Petascale to Exascale	\$227,628
5982	Adaptive Target-Tracking in Multipath Scenarios	\$197,992
5983	Novel nanotoxicology studies using noninvasive real-time microscopy and spectroscopy for physical and chemical characterization of materials and live	\$227,637
5986	A Scalable Framework for Timely Discovery and Situational Understanding of Cyber Attacks	\$393,357
6001	Biosurveillance Data Analysis and Decision Support	\$283,817
6008	Novel Covalent Organic Frameworks with Tailored Carbon Capture Functionality	\$350,582
6026	Optimization of ORNL Neutron Sources to Meet National Mission Needs	\$328,435
6041	Fully-virtualized Computational Energy Infrastructure Model for Improved Cyber Resilience	\$396,215
6055	Automated Software Tools for Engineering Quantum Computers	\$282,394
6060	A hierarchical regional modeling framework for decadal-scale hydro-climatic predictions and impact assessments	\$333,984
6068	Data-Driven Grid Threat Radar for Local-to-Regional Energy-Grid Stability	\$376,654
6070	Synthetic metabolic pathways for bioconversion of lignin and biomass inhibitors	\$449,384
6073	Lignin-based High Performance Li-Ion Anode Materials Synthesized from Low-Cost Renewable Resources	\$350,353
6085	Experimental Test of an Innovative Intense RF-Plasma Source	\$361,321
6090	Conversion of lignin feedstock into an economic automotive grade carbon fiber	\$350,742
6105	Understanding Used Nuclear Fuel Cladding Performance Characteristics During Very Long-Term Storage Through Coupled Experiments and Simulations	\$351,759
6129	An Hydraulically Isolated Fuels and Materials Irradiation Capability for HFIR	\$454,340
6146	SCIENCE OF THE PLASMA-MATERIALS INTERFACE AT EXTREME CONDITIONS	\$349,997

6160	Integrated Computational Modeling and Innovative Processing to Eliminate Rare Earths from Wrought Magnesium Alloys	\$362,972
6172	Improving energy efficiency in thermoelectric materials by integrating neutron scattering with supercomputing and modeling.	\$261,908
6175	Template Assisted Bicontinuous 3D Electrode Architecture for Energy Storage Materials	\$349,913
6195	Coupled Simulation of Surface-Subsurface Hydrologic Processes and Ecosystem and Climate Feedbacks: From Arctic Landscapes to the Continental U.S.	\$322,240
6217	High-Throughput Transcriptomics for Microbial Bioforensic Analysis	\$299,714
6232	Integrative Signaling Modules Guiding Plants Response To Environmental Stresses	\$477,534
6233	Development of the Neutron Based Biomembranes Initiative at NScD	\$279,501
6234	A New Current-Source Boost Inverter Based Smart Power Electronic Interface for Connected Photovoltaic Applications	\$96,603
6235	Real-Time, Portable Neutron Spectroscopy using a Filtered and Moderated Semiconductor Detector Array	\$101,069
6237	Development Approach for Linking Glass Composition and Structure to Long-Term Performance	\$179,719
6241	High Energy Rechargeable Magnesium Batteries Based on Nanostructured Materials	\$319,806
6242	Re-engineering Xylanase	\$202,841
6244	Demonstration of Electric Vehicle Dynamic On-Road Wireless Power Charging	\$323,072
6245	An Accurate and Efficient Computational Methodology for Simulating Disordered Nanoscale Materials	\$224,467
6246	Synthesis of 50Ti Pentamethylcyclopentadienyl trimethyltitanium from Isotopically Enriched Titanium Dioxide for Super Heavy Element Synthesis	\$29,864
6248	Polar Perovskite Oxides with Local-Bond Frustration	\$11,811
6250	Precision Long-Range Projectile Tracking	\$15,462
6254	Event Enumeration for Security Analysis of Embedded Systems (EESAES)	\$115,300
6255	Connecting Combinational and Geometric Tree-Like Structure in Complex Networks	\$155,783
6256	Development of a Thermal-Hydraulics Simulation Tool for High-Fidelity Analysis of Transients in Small Modular Reactors	\$93,151



6257	Zeolite Membranes for the capture of Krypton and Recovery of Xenon from Voloxidation and Dissolver Off-Gas	\$115,463
6259	Determination of Coating Mechanical Properties using In-Situ High Temperature Digital Holographic Imaging	\$109,338
6260	Towards Atomic-level Understanding and Control of the Giant Magnetocaloric Effect: Revolutionary Materials for Efficient and Clean Refrigeration	\$189,471
6261	Technique for Elimination of Excited States From Atomic and Molecular Ion Beams	\$188,476
6262	Electrochemical Energy Storage in Solutions of Renewable Organic Quinonoid Species for Energy Dense Flow Batteries	\$106,073
6263	Creating Tunable Self-Organized Photonic Devices Within Complex Oxides	\$183,067
6264	Advanced Electron Microscopy Studies of Energy-Related Catalysts	\$140,465
6265	A Novel High-Resolution Scintillator for Gamma-Ray Detection: $\text{CaI}_2\text{:Eu}^{2+}$	\$190,253
6266	A Dereplication Strategy for Natural Products Discovery	\$175,002
6267	A Generalized Mathematical and Computational Framework for Predictive Simulation of Complex Stochastic Systems	\$324,458
6268	Perception-Driven Decision Support in Medical Imaging	\$359,554
6271	New Capabilities for Neutron-Based Biomembrane Research at ORNL	\$418,978
6282	Nano-textured, optically transparent, durable superhydrophobic thin film coatings	\$199,785
6285	One stop information shop: personalized content recommendations	\$210,279
6304	Active, composite material for the prevention and treatment of fouled surfaces	\$199,480
6308	Real-Time In-Situ Water (& Air) Field Monitor	\$199,936
6324	Low-cost nanomaterials for PV devices.	\$199,992
6345	Rare Earth Free Magnets: Compute, Create	\$144,870
6346	Growth of Large Area Single Crystal Graphene	\$189,577
6347	Quantum Monte Carlo Development and Applications in Materials Science	\$267,095
6348	Universal Sensing Platform for Autonomous Data Correction in Building Technologies	\$63,372
6349	Accelerating Data Acquisition, Reduction, and Analysis (ADARA) at SNS	\$1,332,165
6350	Integral Vacuum Pump for Flywheel System	\$30,006

6351	Improving the Efficiency of Small-Volume Engines Using Thermally Insulating Cylinder Materials	\$29,441
6353	Secondary Coordination Sphere Effects in Catalyst Design	\$340,905
6404	Hybridizing HPC: Modern Cray Architectures for Big Data Problems	\$4,716
6477	Model-Inspired Science Priorities for Evaluating Tropical Ecosystem Response to Climate Change	\$125,038
6566	Thermonuclear Supernova Simulation: Towards Increased Physical Fidelity to Calibrate the Dark Energy Standard Candle	\$143,132
6567	High Spatial and Temporal Resolution Particle Detectors	\$89,869
6576	Emergent quasi-particles and their detection through neutron scattering	\$41,927
6581	High-throughput, Energy-Efficient System for Obtaining Highly Textured, Large-Crystal Materials	\$202,264
6584	Elucidating & Developing Spillover Catalysis: A New Paradigm for Predictive Catalysis	\$324,289
6616	High Throughput Genetic System Development	\$107,568
6618	I/O Coordination to Improve Application Performance Stability on Exa-scale Platforms	\$72,387
6619	Strigolactones in the Woody Bioenergy Crop Populus	\$84,746
6620	Biofuel Production from Multiple Agave Species	\$132,295
6621	Optimization of Light Collection Efficiency from Liquefied Noble Gases	\$159,472
6622	More Complete Electrodynamics: Validation and Extension for Conductive Media	\$94,989
6623	Joining Neutron Scattering and Simulations towards Improved Lipid Models Ring	\$95,722
6624	High-Rate High-Capacity Reversible Multielectron Cathodes	\$149,853
6625	Multigrid Algorithm for K-Version Finite Element Method	\$55,997
6626	Biological extraction and sequestration of high-value rare earth elements	\$29,717
6627	Systems Approach to Steganalysis	\$77,082
6628	Development of lignin-based activated carbon fibers for methane adsorption applications	\$29,280
6630	Inexpensive Efficient Hybrid Neutron Sensor	\$29,149
6631	Towards High Performance, Earth Abundant, Thin Film Cu <sub>2</sub> O-based Solar Cells	\$89,982
6632	In situ Study of Magnetoelastic Coupling in Magnetic Shape Memory Alloys	\$37,856
6633	Digital Hydraulic Actuator	\$69,042

6634	Image Analysis for Calibration and Comparison of Hyperspectral Retina Fundus Camera Data and Ocular Phenomena	\$10,027
6635	Prototype of Compact Calorimeter Module for Beam Test	\$100,425
6636	The role of geometric structures and hydrodynamics on microbial adhesion and colonization	\$117,616
6637	High-Performance Computer Simulation Study of the Mechanism of Nerve Agent Degradation by an Enzymatic Bioscavenger	\$15,834
6638	Blue-Energy Harvesting by ORNL Mesoporous Carbon Electrodes	\$24,984
6639	Detection and characterization of meso- and nanoscopic bubbles on patterned and native metal surfaces using neutron small-angle scattering and reflectivity techniques	\$25,168
6640	Development of high performance lithium-ion hybrid ultracapacitors	\$17,473
6641	Adaptive Emissivity Surface using Sub-Pixel Averaging	\$19,997
6642	Machine Vision for Underwater Explosive Ordinance Detection	\$15,717
6643	Arrays of piezoelectric nanotubes based on polyvinylidene difluoride	\$27,902
6644	Fabrication of Self-Assembled Superstructures of Opto-Electronic Polymers in	\$15,017
6645	Inverse Sensitivity/Uncertainty Methods Development for Nuclear Fuel Cycle	\$29,958
6646	Development of fiber reinforced composite thermoelectric materials with enhanced reliability and performance	\$23,038
6647	Remote chemical detection using IR microcalorimetric spectroscopy and quantum cascade lasers	\$26,906
6648	Implementation of an Optical Properties Measurement System for Whole Intact Scattering Samples	\$29,989
6649	Titanium/Graphite/Graphene Composite Friction Materials	\$20,177
6650	Sensor-Fusion Technology for Improving Accuracy of Cable Deployed Acoustic Doppler Velocimeter Measurements Subject to Flow Induced Motions	\$28,860
6654	Advancing Lignin-based Carbon Fibers from Lab Scale into the Commercial Market	\$291,138
6655	Synthesis of the Heaviest Atomic Nuclei in Experiments Using Californium Targets	\$241,360
6665	Acoustic Signature Reconstruction in Heavy Foliage	\$33,864

6666	Ultrafast Structural Dynamics Probed by Photoionization and Microwave Rayleigh Scattering from Laser Induced Plasma	\$27,871
6667	Freeze trapping of a bound reaction intermediate using neutron protein crystallography	\$26,616
6668	Stimuli-responsive polymer materials with switchable interfaces	\$9,955
6669	Printed Engines to Enable Characterization of Combustion Processes of Small-scale Internal Combustion Engines	\$5,054
6671	Artificial Antennae: Investigating the Optical Properties of Fluorescent Metallic Nanocluster Assemblies in order to Harvest Solar Energy	\$9,050
<b>Total # of Projects for ORNL: 187</b>		
<b>Total Cost for ORNL: \$32,708,120</b>		
<b>Total Administrative Cost \$194,784</b>		
<b>PNNL - Pacific Northwest National Lab</b>		
PN09005/2173	Advanced Environmental Sampling Technology for Safeguards and Proliferation Detection	\$243,315
PN09008/2176	Advanced Sorptive and Signature Indicating Materials for Ultra-Trace Proliferation Detection	\$209,944
PN09016/2184	Community Diversity and Functional Redundancy of Cellulytic Microbial Communities in Soil Aggregates	\$149,913
PN09036/2204	Higher-Throughput, More Sensitive Stable Isotope Probing	\$243,733
PN09042/2210	Isotopic Ratio Fluence Monitors for Canadian Deuterium Uranium (CANDU) and Pebble Bed Modular Reactor (PBMR) Plutonium Production Verification	\$99,849
PN09047/2215	Microscale Spectroscopic Analyses of Cellulose Degradation and Uptake by a Microbial Community	\$41,932
PN09053/2221	Multiscale Models for Microbial Communities	\$183,622
PN09057/2225	Oxygen Optode for Chemical Imaging in Microfluidic Microbial Models	\$156,244
PN10002/2244	A Scalable Fault Tolerance Infrastructure and Algorithms with Programming Models and Scientific Applications	\$331,947
PN10004/2246	Advanced Nondestructive Assay for Safeguards	\$109,607
PN10010/2252	CO2 Separation Scale-Up	\$281,855
PN10011/2253	Combining Proteomic Technologies to Create a Platform for Spatiotemporal Enzyme Activity Profiling	\$270,038
PN10014/2256	Computational Framework for Diagnostics, Validation and Intercomparison of Numerical Simulators for Geologic Sequestration	\$189,821

PN10022/2264	Development of a Regional Energy and Infrastructure Systems Framework	\$446,986
PN10025/2267	Development of Inorganic Water Oxidation Electrocatalysts	\$199,984
PN10026/2268	Development of Preparative Mass Spectrometry for the Creation of Novel Catalyst Materials	\$265,184
PN10027/2269	Development of Prototype Integrated Earth System and Environmental System Models	\$380,386
PN10028/2270	Development of Rechargeable Li/air Batteries	\$256,525
PN10029/2271	Development of Regional Agriculture-Land Use Models	\$406,060
PN10030/2272	Development of Regional-Global Climate Assessment Model	\$277,431
PN10033/2275	Enabling Hypothesis Driven Research and Discovery in Extreme Data	\$213,608
PN10038/2280	Fundamentals of Carbonate Formation: Interactions of Carbon Dioxide with Supported Metal Oxide Clusters	\$269,969
PN10039/2281	Geological Sequestration Software Suite: Numerical Model Development	\$208,404
PN10042/2284	Identification of Functional Proteins Relevant to Bioenergy and Disease Pathology by Multiplexed Activity-Based Protein Profiling	\$215,316
PN10044/2286	In Situ High-Pressure X-Ray Diffraction Investigation of Caprock Mineral Reactions With Water Solvated in Supercritical CO <sub>2</sub>	\$211,872
PN10048/2290	Integrated Regional Earth System Model (iRESM) Prototype Regional Testbed Specification and Selection	\$332,180
PN10049/2291	Integrating Power and Performance Modeling for Exascale Systems	\$293,708
PN10050/2292	Light Source Photocathode Performance and Development	\$281,190
PN10051/2293	Materials and Methods for Low Cost Photovoltaic Manufacturing	\$229,608
PN10055/2297	Micro-Fluidic Models for Studying Microbial Communities-- Integration of Micro-Fluidic Model Experimentation, Multimodal Imaging, and Modeling	\$307,155
PN10056/2298	Micromodel Pore-Scale Studies of Caprock-Sealing Efficiency and Trapping Mechanisms Related to CO <sub>2</sub> Sequestration	\$274,872
PN10057/2299	Mining the Data from Research on Dogs Exposed to Internally-deposited Radionuclides	\$96,296
PN10058/2300	Molecular Structure and Interaction at Aqueous, Non-Aqueous Liquid Interfaces and Catalytic Solid Surfaces	\$309,389
PN10060/2302	Multiphysics Capability Development and Application to Magnesium Alloys	\$150,006

PN10061/2303	Next Generation Software for Automated Structural Identification of Metabolites	\$173,864
PN10062/2304	Non-Metal Activation of Hydrogen for Energy Storage in Chemical Bonds	\$204,743
PN10063/2305	Novel Carbon Capture Materials	\$323,500
PN10067/2309	Predicting the Feasibility of Geologic Co-Sequestration of CO <sub>2</sub> , SO <sub>x</sub> and NO <sub>x</sub> Under a Broad Range of Conditions	\$196,360
PN10069/2311	Proteomics Measurements of Functional Redundancy and Stability Testing of Cellulose Degrading Anaerobic Microbial Communities Within Engineered Bioreactors	\$345,686
PN10074/2316	Three-Dimensional Structured Composite Nanomaterials for Energy Storage	\$438,561
PN10078/2320	Understanding the Sources and Consequences of Uncertainties	\$426,137
PN10079/2321	Visualizing Uncertainty in Conceptual and Numerical Models for Geological Sequestration	\$266,995
PN11001/2323	A Multi-Modal Integration Framework for Chemical Imaging	\$345,756
PN11002/2324	A Distributed Systems Architecture for the Power Grid	\$249,370
PN11004/2326	A Statistical State Prediction Methodology to Improve Reliability and Efficiency of Power System Operation	\$194,651
PN11005/2327	A Virtual Testing Toolbox for Predicting the Properties and Behavior of Multiphase Materials in Disposal Environments	\$90,578
PN11007/2329	Advanced Statistical Network Models for the Integration of Experimental and Open Source Textual Data for Bioforensic Analyses	\$273,818
PN11008/2330	Aspergillus niger as a Platform for exploitation of the Advanced Biofuel Producing Potential of Filamentous Fungi	\$114,813
PN11010/2332	Characterization of Energy Storage Systems Using In Situ and Ex Situ Nuclear Magnetic Resonance Spectroscopy	\$320,638
PN11011/2333	Characterization of Signaling Networks in Single Cells	\$228,774
PN11012/2334	Chemical Imaging Analysis of Environmental Particles	\$342,755
PN11013/2335	Compressive Sensing for Threat Detection	\$219,471
PN11014/2336	Conversion of Biomass to Jet Fuels	\$130,187
PN11015/2337	Correlative High Resolution Imaging and Spectroscopy to Characterize the Structure and Biogeochemical Function of Microbial Biofilms	\$352,283
PN11016/2338	Cyber/Physical Security Vulnerability Assessment Integration	\$138,687
PN11019/2341	Data-Intensive Algorithms for Bioinformatics-Inspired Signal Detection	\$277,385
PN11020/2342	Decision Support for Future Power Grid Organizations	\$245,132

PN11021/2343	Developing Functionality and Performance Enhancements to the Global Array Toolkit	\$353,704
PN11024/2346	Development of Bifunctional Electrocatalysts for Rechargeable Lithium-Air Batteries	\$249,592
PN11025/2347	Development of Coupled Flow, Thermal and Geomechanical Capability for Carbon Sequestration	\$250,056
PN11026/2348	Development of Functionalized Nanoporous Materials for Bioenergy and Biomedical Applications	\$249,989
PN11028/2350	Development of New Soft Ionization Mass Spectrometry Approaches for Spatial Imaging of Complex Chemical and Biological Systems	\$318,763
PN11030/2352	Development of Parallel Multi-Reference Coupled Cluster Capabilities	\$300,094
PN11032/2354	Enabling the Meaningful Exploitation of Integrated Regional Earth Systems Data	\$618,006
PN11033/2355	Enhanced Bioremediation of Uranium Contamination at DOE Sites Via Novel Directed Evolution of Uranium Specific Reductase on Bacteriophage Surface	\$203,759
PN11035/2357	Facet Specific Chemistry of Noble Metal Nanoparticles Using an Enhanced Scattering Infrared Scattering Near-Field Optical Microscope	\$359,043
PN11036/2358	Geological Sequestration Software Suite Framework	\$299,744
PN11037/2359	High-Capacity Reversible Metal Hydride Air Battery	\$149,661
PN11040/2362	In Situ Molecular-Scale Investigations of Reactions between Supercritical CO <sub>2</sub> and Minerals Relevant to Geological Carbon Storage	\$572,000
PN11041/2363	Increased Sensitivity and Improved Quantification of Th and U in Particles by SIMS	\$218,059
PN11043/2365	Integrated Nano-Scale Imaging for Investigating Applications and Implications of Nanomaterials	\$234,510
PN11044/2366	Integrating Multimodal Chemical Imaging Instrumentation by Data Reduction and Resolution Merge	\$74,812
PN11045/2367	Intelligent Networked Sensors Capable of Autonomous, Adaptive Operations in the Electric Power System	\$401,776
PN11046/2368	Linear Algebra Solvers and Associated Matrix-Vector Kernels for Power Grid Simulations	\$195,291
PN11047/2369	Low Frequency Electromagnetic Interrogation Techniques for Container Content Signature Detection	\$159,305
PN11049/2371	Mapping Molecular Dynamics Algorithmic Parallelism to Heterogeneous Architectures	\$263,339

PN11050/2372	Massively Parallel Sequencing Technology for the Forensic Identification of the "Unknown" Biological Threat Agent(s) Recovered from the Biological Crime Scene	\$185,547
PN11051/2373	Meta-Material Coatings for Daylighting Windows	\$125,004
PN11052/2374	Microbial Processes Accompanying Deep Geologic CO2 Sequestration	\$123,722
PN11053/2375	Modeling of Distributed Energy Resources in the Smart Grid	\$345,748
PN11054/2376	Multi-Resolution Data Model and Directed Data Reduction, Reconstruction and Aggregation	\$375,083
PN11055/2377	Multiscale Synthetic Studies Targeted Towards the Development of Nanostructured Heterogeneous CO2 Reduction Catalysts	\$220,421
PN11056/2378	Nanoscale-Macroscale Three-Dimensional Integration Using High Performance Computing	\$199,997
PN11057/2379	Neutron Signature Detection Requirements for Identifying Warhead Configurations	\$178,854
PN11059/2381	Novel N/gamma Flux Monitoring Materials for Safeguards and Proliferation Detection	\$150,196
PN11060/2382	Optical Upconversion for Passive and Active Millimeter and Terahertz Imaging	\$134,349
PN11061/2383	Photocathode Development for Next-Generation Light Sources	\$273,890
PN11063/2385	Quantify the "State of Health" of Nuclear Structure/Materials with an Inverse Resonance Inspection Algorithm	\$98,639
PN11064/2386	Rare Earth-less Permanent Magnet	\$160,433
PN11065/2387	Real-time High-Performance Computing Infrastructure for Next-Generation Power Grid Analysis	\$197,120
PN11066/2388	Scalable Sensor Data Management Middleware	\$366,654
PN11067/2389	Signature Discovery Analytic Framework	\$287,084
PN11068/2390	Signature Quality Metrics	\$303,604
PN11069/2391	Single Node Optimizations for Extreme Scale Systems	\$302,433
PN11070/2392	Site Specific Atomic Resolution Probing of Structure-Property Relationship Under Dynamic and/or Operando Conditions Using In Situ and Ex Situ Chemical Imaging Based on Multi-Instrument Approach	\$492,204
PN11071/2393	SoftShuffle: A Game Changer for Secure Software System Implementation	\$80,563
PN11072/2394	Stabilized Li Metal Anode for Li Batteries	\$300,033
PN11073/2395	Statistically Significant Forensic Fingerprinting: Protein Analysis of Biological Agents	\$148,507



PN11074/2396	Synergistic Integration of Feature Recognition and Analysis for Chemical Imaging Data	\$134,970
PN11075/2397	The Statistical Mechanics of Complex Process in Bulk and Interfacial Environments	\$246,461
PN11077/2399	Uncertainty Quantification and Risk Assessment Pipeline for Carbon Sequestration	\$264,093
PN11078/2400	Understanding the Processes that Govern Subsurface Microbial Communities	\$279,102
PN12001/2402	A Multi-Layer Data-Driven Advanced Reasoning Tool for Smart Grid Integrated Information Systems	\$220,733
PN12002/2403	Absolute Gas Counting Measurement Techniques	\$245,376
PN12003/2404	Actionable Visualization Tools For Power Grid Situation Awareness	\$208,303
PN12004/2405	Advanced Condition Monitoring of Microstructure Evolution and Property Degradation in Current and Advanced Nuclear Reactor Alloys	\$99,572
PN12005/2406	Optofluidics and Microfluidics for Exploring Biofuel Production at the Single Cell and Molecule Levels	\$75,515
PN12006/2407	Advanced Optimizations for Extreme-Scale Homogeneous Systems	\$311,800
PN12007/2408	Advanced Surface Mass Spectrometry for Characterization of Explosives	\$143,580
PN12008/2409	Analysis of Functional Potential from Metagenome Data	\$64,314
PN12009/2410	Argon-39 Measurement	\$59,106
PN12010/2411	Automated Thermal Image Processing to Identify and Enumerate Targets of Interest	\$50,213
PN12011/2412	Background Reduction for Nonmetallic Nuclear Detection Components	\$296,182
PN12012/2413	BazookaSPECT Neutron Imager	\$104,675
PN12013/2414	Biodegradable Linear Polycarbonates Through Catalytic Polymerizations of CO <sub>2</sub> Utilizing Switchable Ionic Liquids	\$98,149
PN12014/2415	Characterization of a 14 MeV Neutron Generator and Measurement of Fission Products Produced	\$149,067
PN12015/2416	Characterization of Catalyst Materials in the Electron and Atom-Probe Microscopes	\$388,941
PN12016/2417	Computational Optimization and Predictive Simulation for Synthetic Biology	\$175,945
PN12017/2418	Cooperative Control of Distributed Energy Resources for Grid Support	\$164,937
PN12018/2419	Cyber Security Experimentation and Repeatability	\$173,371
PN12019/2420	Decision Support Research for Integrated Regional Earth System Modeling	\$182,149

PN12020/2421	Development and Deployment of Reactive Surface Area Measurement Capabilities Using Nuclear Magnetic Resonance Spectroscopy	\$417,136
PN12021/2422	Development of a Low-Cost Reliable Barometric Air Flow Station for Air-Handling Units	\$39,439
PN12022/2423	Development of Functional Membranes for Improved Selectivity	\$132,343
PN12023/2424	Development of Graphene/Ionic Liquid Hybrid Material for Ultracapacitors	\$208,745
PN12024/2425	Development of Hard X-Ray Emission Spectroscopy Nanoprobe	\$177,264
PN12025/2426	Directed Strain Evolution through Riboswitch-Controlled Regulatory Circuit	\$95,166
PN12026/2427	Encrypted CPU Instruction Stream	\$189,348
PN12027/2428	Environmental Chamber Studies of the Interactions of Anthropogenic and Biogenic VOCs	\$397,912
PN12028/2429	Experts Inundated with Data: the Biomarker Problem	\$302,909
PN12029/2430	Exploitation of Kinetic Processes in Gas Separations	\$114,370
PN12030/2431	Exploiting Correlated Radiographic and Passive Signatures for Threat Detection in Cargo	\$174,221
PN12031/2432	Exploration of Human and Environmental System Interactions due to Renewable Technology Penetration in the Midwest Pilot Region	\$485,277
PN12032/2433	Extreme Scale Capabilities for Subsurface Science and Engineering	\$75,950
PN12033/2434	Forensic Analysis with Time Stamped Coincidence Sampled Gamma Radiation Spectroscopy	\$200,001
PN12034/2435	Forward Osmosis System for Integrated Desalination and Carbon Dioxide Separation	\$49,701
PN12035/2436	Future Power Grid Control Paradigm	\$302,106
PN12036/2437	Glider-Based Passive Acoustic Detection System Capability Development	\$118,184
PN12037/2438	GRADIENT: Graph Analytic Approach for Discovering Irregular Events - Nascent and Temporal	\$286,400
PN12038/2439	Highly Efficient and Cost Effective Gamma Detection Arrays for FRIB	\$148,585
PN12039/2440	Hybrid Electrodes for Next Generation High Energy Ultracapacitors	\$202,849
PN12040/2441	Identifying Cyber Assets and Inferring Criticality	\$50,491
PN12041/2442	Imaging the Nucleation and Growth of Nanoparticles in Solution	\$194,711
PN12042/2443	Immense Social Media Stream Analytics	\$180,457
PN12043/2444	Integrating Advanced Optimizations for Extreme Scale Systems	\$94,054

PN12044/2445	Integration of Molecular Imaging Techniques to Probe the Photoinduced Charge Transfer in Semiconductor Quantum Dots-Polymer Hybrid Solar Cells	\$185,007
PN12045/2446	Low Energy Threshold Germanium Detectors and Science	\$524,957
PN12046/2447	Low-Noise, Low-Background Electronics	\$382,699
PN12047/2448	Mapping and Characterization of Organic Matter in Soil Aggregates using Laser-Ablation Sampling	\$123,757
PN12048/2449	Microscale Reconstruction of Biogeochemical Substrates Using Combined X-ray Tomography and Scanning Electron Microscopy	\$84,648
PN12049/2450	Mu2e September Beam Test	\$59,689
PN12050/2451	Multimedia Analysis of Cyber Data	\$151,366
PN12051/2452	Multiscale Modeling of Energy Storage Materials	\$386,083
PN12052/2453	Multiscale Simulation of Microbial Carbon Transformation in Soils: Connecting Intra- and Inter-Aggregate Scales	\$59,614
PN12053/2454	Multi-Source Signatures of Nuclear Programs	\$269,189
PN12054/2455	Next Generation Network Simulations for Power System Applications	\$383,956
PN12055/2456	Non-destructive Challenge Measurements of Environmental Radiotracers	\$161,569
PN12056/2457	Novel Detector Configurations	\$145,835
PN12057/2458	Novel In-Situ Monitoring Framework for Environmental Degradation of Reactor Structural and Fuel Materials	\$136,799
PN12058/2459	Nuclear Astrophysics Measurements using High-efficiency HPGe Arrays	\$99,883
PN12059/2460	Numerically Robust Climate Simulation Through Improved Interaction between Model Components	\$223,654
PN12060/2461	OnSpec Advanced Condition Monitoring and Fundamental Research of Aggregation Precursors in Nuclear Materials Reprocessing	\$150,235
PN12061/2462	Predicting the Response of Complex Biological Systems	\$289,377
PN12062/2463	Probing Composition and Structure of Polarizable Reaction Mixtures Inside the Pores of Supported Metal-oxo Catalysts	\$88,571
PN12063/2464	Probing Structural Dynamics with High Spatial and Temporal Resolution	\$790,997
PN12064/2465	Prototype Fast Neutron Detector	\$192,396
PN12065/2466	Pulmonary Injury from Acute Events Related to Nuclear Energy Production	\$203,987
PN12066/2467	Quantitative Framework Development to Support Effective Monitoring for Metal and Radionuclide Contamination	\$67,371

PN12067/2468	Quantitative Imaging of Atomic Scale Chemistry Changes at Interfaces	\$383,123
PN12068/2469	Restructuring FEDS for Continued Growth and Expanding Markets: GUI Update	\$95,238
PN12069/2470	Search for New Physics at the Intensity Frontier	\$230,066
PN12070/2471	Semantic Workflows for Signature Discovery	\$247,765
PN12071/2472	Simultaneous 14C and T Dating: A Case Study Using Soil Organic Matter	\$90,189
PN12072/2473	Stable and High Voltage Electrolytes for Lithium Ion Batteries	\$105,445
PN12073/2474	Tank Residual Waste Stabilization to Reduce Contaminant Release	\$208,640
PN12074/2475	Targeting Extreme Scale Computational Challenges with Heterogeneous Systems	\$341,608
PN12075/2476	TASCEL: An Execution Model for Task-Based Optimizations	\$309,143
PN12076/2477	Three Dimensional Neutronics Analysis Capabilities for Nuclear Archeology Applications	\$144,912
PN12077/2478	Translating Microbial Ecology Advances into Applied Tools for Remediation and Monitoring	\$70,042
PN12078/2479	Ultra-Low-Background Gas Measurement: Building an Advanced Capability	\$289,908
PN12079/2480	Ultra-Precise Electron Spectroscopy to Measure the Neutrino Mass	\$230,225
PN12080/2481	Uranium Enrichment Facility Signature Exploitation	\$212,895
<b>Total # of Projects for PNNL: 182</b>		
<b>Total Cost for PNNL: \$41,454,692</b>		
<b>Total Administrative Cost -\$41,676</b>		
<b>PRINCE - Princeton Plasma Physics Lab</b>		
PPPL-016	X-ray Imaging Schemes with Matched Pairs of Spherically Bent Crystals	\$73,486
PPPL-019	Multiscale Gyrokinetics for Magnetic Reconnection Plasmas	\$92,037
PPPL-020	Development of Physical Models and Numerical Tools for Plasmas Interacting with the Absorbing Surface	\$60,355
PPPL-021	Study of Magnetic Reconnection in Partially Ionized, Low-Temperature Plasmas	\$95,707
PPPL-022	Developing a Prototype Gyrokinetic Code Using Advanced Algorithms for Non-axisymmetric and Edge Plasmas	\$105,620
PPPL-023	High Density Plasma Capsule for Raman Backscatter	\$148,935

PPPL-024	Development of a Program of Plasma-Facing Components (PFCs) and Investigation of Plasma-Material Interactions Involving the PFCs	\$19,856
PPPL-026	Magnetic Fusion Energy (MFE) Pilot Plant Study	\$273,457
PPPL-027	Laboratory for Plasma-Based Nanotechnologies	\$241,932
PPPL-028	Production of TC-99m absent HEU	\$60,135
PPPL-029	Development of Next Step Experiments for Plasma Astrophysics	\$148,285
PPPL-030	Design Study for a Flowing-wall Liquid Lithium Tokamak	\$4,522
PPPL-031	2D Linear Mode Conversion Calculations for Solar and Heliospheric Radio Emissions	\$154,041
PPPL-032	Mission and Configuration of a Spherical Tokamak Fusion Nuclear Science Facility	\$255,041
PPPL-033	High-Throughput Mass Filter	\$20,481
PPPL-034	Prototype of a Scalable Flowing Liquid Lithium System	\$119,402
PPPL-035	Next Step Development of an Actively-cooled and Wetted Liquid Metal Divertor Target and Test Components	\$102,747
PPPL-036	Fundamental Studies of Deuterium Retention in Solid and Liquid Metals	\$139,803
PPPL-037	Liquid Lithium Test Stand and Textured Surface Test	\$83,218
<b>Total # of Projects for PRINCE: 19</b>		
<b>Total Cost for PRINCE: \$2,199,060</b>		
<b>Administrative Cost Paid by Laboratory Overhead</b>		
<b>PTX - Pantex Plant</b>		
PX07008	Composition and Strength of Ta-Based Welds for Storing SNM Materials	\$196,922
PX09002	Gas Reactions Within Sealed Volume of LANL and LLNL Weapons	\$2,882
PX09003	Optimization of High Explosive Molecular Weight Binder Analysis in Core Surveillance	\$94,510
PX09004	Ultra Performance Liquid Chromatography	\$5,073
PX09007	Lightning and Production Throughput	\$21,471
PX09013	Severe Insults to High Explosives	\$64,671
PX09015	Fracture Mechanics of HMX Based High Explosive Components	\$33,178
PX10001	RF ID Tracking of Medical Records	\$141,806
PX10002	Effects of Temperature on Explosives	\$96,982
PX10004	Test Equipment Environmental Sensor	\$27,847
PX10007	Drip casting to separate precious metals from base metals	\$94,150
PX10009	Laser Gas Sampling of unweldable tube stock	\$4,558
PX11001	Gas Gun Firing Mechanism	\$12,492

PX11004	Ignition Properties of Energetic Materials	\$65,873
PX11013	System Dynamic Modeling	\$141,236
PX11014	Adiprene replacement formulation and dynamic mixing requirements	\$224,617
PX12001	Economic Model to Justify New Production Capacity	\$21,439
PX12002	Material Qualification for Nuclear Explosives Processes	\$51,614
PX12004	High Explosive Machining Hazards Evaluation	\$100,991
<b>Total # of Projects for PTX: 19</b>		
<b>Total Cost for PTX: \$1,402,312</b>		
<b>Total Administrative Cost \$260,265</b>		
<b>SLAC - SLAC National Accelerator Laboratory</b>		
2012-01	Climate Change Science - Snapshots of Heterogeneous Ice Nucleation with LCLS	\$112,339
2012-02	Nanomaterials and Their Characterization for Energy Storage	\$278,935
2012-03	Synthesis and Characterization of Highfrequency Magnetic Metamaterials for Turnable Light Harvesting and Emission	\$150,187
2012-04	Proof-of-Principle for Mass Production of Large Germanium Detectors for Large Scale Dark Matter Search Experiments	\$412,536
2012-05	New Initiative for Synchrotron Radiation-based Catalysis and Energy Research	\$309,585
2012-06	Towards in-Situ Growth and Spectroscopy of Complex Oxide Thin Films Heterostructures	\$329,807
2012-07	SEM FE Probe Surface Science Study	\$154,388
2012-08	X-Band Gun Evaluation	\$400,616
2012-09	Development of Ultrafast High-Repetition Rate Capabilities for Spear3 and PEP-X	\$271,897
2012-10	X-Ray Studies of Water and Aqueous Solutions	\$113,711
2012-11	Towards the SLAC Femtosecond Macromolecular Micro & Nanocrystallography Facilities	\$345,629
2012-12	Microwave Structure for Short Period Undulator	\$373,518
2012-13	In-Situ X-ray Characterization and Nanoscale Imaging of Energy Storage Nanomaterials	\$138,440
2012-14	Modeling Conformational Ensembles of Proteins and Complexes	\$116,015
2012-15	An Automated Pipeline for Cosmological Mock Sky Survey Production	\$236,067
2012-16	Correlated Electron Physics at Oxide Interfaces	\$82,281
2012-17	X-Ray Scattering from Solution-Cast Films for Organic Solar Cells	\$271,304
<b>Total # of Projects for SLAC : 17</b>		

Total Cost for SLAC : \$4,097,255		
Administrative Cost Paid by Laboratory Overhead		
SNL - Sandia National Lab		
141076	Responsive Nanocomposites	\$395,896
141505	An Internet Emulation System to Enable Predictive Simulation of Nation-Scale Internet Behavior	\$1,044,606
141506	Effects of Morphology on Ion Transport in Ionomers for Energy Storage	\$983,942
141508	Multiscale Models of Nuclear Waste Reprocessing: From the Mesoscale to the Plant-Scale	\$1,031,837
141509	Predictive Multiscale Modeling of Thermal Abuse in Transportation Batteries	\$914,334
141510	Risk Assessment of Climate Systems for National Security	\$786,877
141511	Streaming Data Analysis for Cybersecurity	\$946,861
141512	Calculations of Charge Carrier Mobility and Development of a new Class of Radiation Sensors for Real-time 3D Source Location	\$429,969
141513	Chirality-Controlled Growth of Single-Walled Carbon Nanotubes	\$514,336
141514	Development of Electron Nano-Probe Technique for Structural Analysis of Nanoparticles and Amorphous Thin Films	\$457,960
141515	Dynamically and Continuously Tunable Infrared Photodetector Using Carbon Nanotubes	\$590,750
141517	Efficient, High-Voltage, High-Impedance GaN/AlGaN Power FET and Diode Switches	\$494,265
141518	Electrodeposition of Scalable Nanostructured Thermoelectric Devices with High Efficiency	\$681,856
141519	Greater-Than 50% Efficient Photovoltaic Solar Cells	\$409,065
141520	Microfabricated Nitrogen-Phosphorus Detector: Chemically Mediated Thermionic Emission	\$825,791
141521	Nanoporous Polymer Thin-Films from Tri-Block Copolymers	\$449,771
141522	Surface Engineering of Electrospun Fibers to Optimize Ion and Electron Transport in Li+ Battery Cathodes	\$464,227
141523	Understanding the High Temperature Limit of THz Quantum Cascade Lasers (QCLs) Through Inverse Quantum Engineering (IQE)	\$523,573
141524	Construction of an Abiotic Reverse-Electron Transfer System for Energy Production and Many Biocatalytic Pathways	\$343,033

141528	From Benchtop to Raceway: Spectroscopic Signatures of Dynamic Biological Processes in Algal Communities	\$782,325
141529	From Sensing to Enhancing Brain Processes	\$471,100
141530	Genome-Wide RNA Interference Analysis of Viral Encephalitis Pathogenesis	\$567,120
141531	Neurological Simulations for Emerging Brain Maps	\$601,855
141532	Real-time Neuronal Current Imaging of the Human Brain to Improve Understanding of Decision Making Processes	\$395,252
141533	Advanced K-Shell X-Ray Sources for Radiation Effects Sciences on Z	\$489,719
141534	High Pulse Energy Fiber Laser Sources	\$230,992
141535	Mixed Hostile-Relevant Radiation Capability for Assessing Semiconductor Device Performance	\$491,002
141537	Stability of Fusion Target Concepts on Z	\$989,756
141538	Ultrashort Pulse Laser-Triggering of Long Gap High Voltage Switches	\$600,349
141540	X-Ray Thomson Scattering Measurements of Warm Dense Matter	\$1,066,468
141541	2D Tracking of Maneuvering and Closely Spaced Targets and Fusion into 3D Tracks	\$448,161
141595	Hybrid Femtosecond/Nanosecond Pulsed Laser Machining	\$168,839
141596	Investigating Payloads and Missions for CubeSat Systems	\$790,317
141597	Laser Characterization and Prediction for Silicon Sensors	\$782,856
141598	Remote Laser Location and Identification	\$464,242
141605	Packaged Integrated Thin Sensor	\$707,905
141606	Remote Sensing of Gases for Greenhouse Gas Monitoring and Treaty Verification	\$398,767
141613	Use of Phase Conjugation in High Energy Laser Systems	\$383,753
141614	Advanced Battery Materials for Improved Mobile Power Safety	\$685,962
141615	Bridging the Gap Between Atomistic Phenomena and Continuum Behavior in Electrochemical Energy Storage Processes	\$439,197
141616	Development of Coherent Germanium Neutrino Technology (CoGeNT) for Reactor Safeguards	\$391,620
141617	First-Principles Flocculation as the Key to Low Energy Algal Biofuels Processing	\$944,717
141618	Novel Room Temperature Synthesis of Nuclear Fuel Nanoparticles by gamma-Irradiation	\$634,572
141619	Programmable Nanomaterials for Reversible CO2 Sequestration	\$620,432
141668	Radionuclide Transport from Deep Boreholes	\$710,115



141670	Transportation Energy Pathways	\$486,455
141678	Graded Engagement of Small Aircraft and UAVs for Physical Protection	\$443,533
141680	Rapid Radiation Biodosimetry to Mitigate Exposure Scenarios	\$400,571
141689	Meso Scale Highly Elastic Structures (MESHERS) for Surety Mechanisms	\$421,071
141690	Nanoparticle Based Filler for Neutron Generator Epoxies	\$180,084
141691	Selective Stress-based Microcantilever Sensors for Enhanced Surveillance	\$532,850
141692	The Role of Hydrogen Isotopes in Deformation and Fracture of Aluminum Alloys	\$355,404
141704	Nature versus Nurture in Cellular Behavior and Disease	\$702,686
141712	Understanding the Fundamentals of Plastic Deformation	\$249,862
141927	Development of First-Principles Methodologies to Study Electro-Catalytic Reactions at Metal/Electrolyte Interfaces	\$57,208
141929	Effect of Doping on the Performance of Solid-Oxide Fuel Cell Electrolytes Produced by a Combination of Suspension Plasma Spray and Very Low Pressure Plasma Spray	\$42,050
141930	Quantum Enhanced Technologies (QET)	\$46,938
141931	Remote Sensing Using Optical Filaments	\$23,982
141932	Modeling and Simulation of Explosive Dispersal of Liquids	\$29,704
141933	MBE Growth and Transport Properties of Carbon-Doped High Mobility Two-Dimensional Hole Systems	\$46,822
142042	RapTOR: Rapid Threat Organism Recognition	\$4,336,037
142044	Power Reduction Techniques for Modern Modulation Schemes	\$41,058
142440	Metrology of 3D Nanostructures	\$26,328
142441	Genetic Engineering of Cyanobacteria as Biodiesel Feedstock	\$258,242
142540	Surety Portal	\$449,632
142543	Enabling Self-Powered Ferroelectric Nanosensors: Fundamental Science of Interfacial Effects Under Extreme Conditions	\$484,934
145832	Integration of Block-Copolymer With Nanoimprint Lithography: Pushing the Boundaries of Emerging Nanopatterning Technology	\$522,574
146013	Advanced Constitutive Models for Thermally Activated Shape Memory Polymers: Connecting Structure to Function	\$59,850

146152	Scalable Assembly of Patterned Ordered Functional Micelle Arrays	\$489,485
147374	Characterization of Failure Modes in Deep UV and Deep Green LEDs Utilizing Advanced Semiconductor Localization Techniques	\$75,105
147942	Photoelectronic Characterization of Heterointerfaces	\$71,329
148066	Guiding Options for Optimal Biofuels	\$79,980
148196	Laser-Based Radiation-induced Conductivity in Kapton Polyimide Dielectrics at High Dose Rates	\$70,379
148373	Modeling a Chemical Defense Strategy	\$80,096
148549	Ion-Photon Quantum Interface: Entanglement Engineering	\$75,744
148898	Diffusion Among Cognitively Complex Agents in Limited Resource Settings	\$103,492
148900	Localized Temperature Stable Dielectrics for Low Temperature Co-Fired Ceramic	\$103,781
148957	Fundamental Hydrogen Interactions With Beryllium Surfaces: A Magnetic Fusion Perspective	\$105,634
149568	Development of Chemiresponsive Sensors for Detection of Common Homemade Explosives	\$83,883
149655	Effective Programming Tools and Techniques for the New Graph Architecture HPC Machines	\$125,978
149705	Ultrasensitive, Amplification-Free Assays for Detecting Pathogens	\$124,320
150123	Stochastic Study of Microparticle Adhesion due to Capillary Condensation	\$135,987
150638	Studies in High Rate Solidification	\$167,248
150774	Polyoxometalate "Solutions" for Energy Storage	\$174,887
150966	An Adaptive Approach to Modeling Human Reasoning	\$173,545
150968	Elucidating the Role of Interfacial Materials Properties in Microfluidic Packages	\$179,917
151170	A Model-Based Approach for Detection and Avoidance of Subversion in System Development Tool Chains	\$180,368
151263	First Principles Prediction of Radio Frequency Directed Energy Effects	\$310,777
151264	Polarimetric Change Detection Exploitation of Synthetic Aperture Radar Data	\$489,360
151266	Ultra-Thin, Temperature Stable, Low Power Frequency References	\$287,638
151267	Efficient Thermal Neutron Detection Using Gadolinium Conversion Layers	\$307,953
151269	Cryogenic FPA Optical Interconnects	\$312,538
151270	Trusted Execution Methodology · Payload / Operating System (TEM·P/OS)	\$490,269

151273	Nephelae: Harnessing the Cloud	\$475,512
151275	Matterwave Interferometer for Seismic Sensing and Inertial Navigation	\$454,428
151276	Spectro-Temporal Data Application & Exploitation	\$591,945
151277	Adaptive Automation for Supervisory Control of Streaming Sensors	\$494,809
151278	Phase Diversity for Advanced Systems	\$280,164
151279	Localized Die Thinning for F/A of Advanced CMOS Designs	\$202,268
151281	Remote Identification and Characterization of Advanced Materials using Hyperspectral Imaging	\$210,237
151283	Novel Signal Transmission and Intercept Methods Using Applied Information Theory and COTS Radios	\$146,812
151284	Automated Severity Assignment for Software Vulnerabilities	\$246,351
151285	Command Intent on the Future Battlefield: One-to-Many Unmanned System Control	\$439,583
151286	Multi-Mission Software-Defined RF Spectrum Processing	\$250,816
151287	A Scalable Emulytics Platform for Observation of Windows-centric Network Phenomena	\$383,108
151288	Quantifiably Secure Power Grid Operation, Management, and Evolution	\$732,338
151289	Predicting Structure-Property Relationships for Interfacial Thermal Transport	\$510,713
151291	Physics-Based Multiscale Stochastic Methods for Computational Mechanics of Heterogeneous Materials	\$633,580
151292	Network and Ensemble Enabled Entity Extraction in Informal Text (NEEEEIT)	\$544,871
151293	Kalman-Filtered Compressive Sensing for High Resolution Estimation of Anthropogenic Greenhouse Gas Emissions from Sparse Measurements at Global Scale	\$560,361
151294	Multiscale Modeling for Fluid Transport in Nanosystems	\$389,699
151295	Statistically Significant Relational Data Mining	\$538,772
151297	Integrated Nano- and Quantum Electronic Device Simulation Toolkit	\$586,759
151299	Control and Optimization of Open Quantum Systems for Information Processing and Computer Security	\$438,341
151300	CO2 Reuse Innovation - Novel Approach to CO2 Conversion Using an Adduct-Mediated Route	\$410,896
151301	Development of Alkaline Fuel Cells	\$362,733
151302	Constitutive Framework for Simulating Coupled Clay/Shale Multiphysics	\$423,187
151303	In-Situ Diagnostics for Fuels Model Validation with ACRR	\$439,280

151304	Tier 2 Development of Sandia's Air Bearing Heat Exchanger Technology	\$306,887
151305	Fundamental Study of CO <sub>2</sub> -H <sub>2</sub> O-Mineral Interactions for Carbon Sequestration, with Emphasis on the Nature of the Supercritical Fluid-Mineral Interface	\$581,349
151307	Development and Deployment of a Field Instrument for Measurements of Black Carbon Aerosols	\$576,662
151308	Tailoring Next-Generation Biofuels and their Combustion in Next-Generation Engines	\$1,045,991
151310	Simulation of Component Transport and Segregation in Nuclear Fuels	\$421,726
151312	Extending Algorithms for Pattern Detection in Massive Data Sets to Commodity Cloud Platforms	\$464,782
151313	Development of a Modeling Framework for Infrastructures in Multi-Hazard Environments	\$413,891
151314	Energy Security Assessment Tools	\$472,118
151315	Using Fast Neutron Signatures for Improved UF <sub>6</sub> Cylinder Enrichment Measurements	\$394,930
151316	Open Source Information Verification	\$354,816
151318	Human Cargo Detection Via a Microfabricated Pulsed-Discharge Ionization Detector	\$303,131
151321	Predictive Modeling of Non-Ideal Explosives	\$761,678
151322	Desorption Electrospray Ionization ? Differential Mobility Spectrometry (DESI-DMS) for Homemade Explosives Detection	\$175,252
151323	Advanced High Security Command and Control Interface (AHSC2I)	\$439,939
151324	Genomics-Enabled Sensor Platform for Rapid Detection of Viruses Related to Disease Outbreak	\$418,816
151325	High Energy Resonance Radiography by Double Scatter Spectroscopy	\$527,264
151326	Enhanced Micellar Catalysis	\$347,351
151328	Nanoscale Mechanisms in Advanced Aging of Materials During Storage of Spent "High Burnup" Nuclear Fuel	\$458,386
151329	Active Infrared Plasmonics	\$545,662
151332	Monolithically-Integrated Coherent Mid-Infrared Receiver	\$516,466
151333	Non-Abelian Fractional Quantum Hall Effect for Fault-Resistant Topological Quantum Computation	\$389,361
151334	Germanium on Silicon Optoelectronics	\$624,830
151335	Fundamental Investigation of Chip-Scale Vacuum Micropumping (CSVMP)	\$355,729

151336	Coherent Phonon Generation Through Nanoscale Enhanced Light-Matter Interaction: Towards Novel Silicon Lasers, Broadband Phononic Signal Processing and Optically Powered Micromechanics	\$619,039
151337	Photodefined Micro/Nanostructures for Sensing Applications	\$476,721
151338	Theoretical and Experimental Studies of Electrified Interfaces Relevant to Energy Storage	\$724,506
151339	Developing Thermoelectric Cryo-Cooling	\$886,890
151340	Improving the Electrical and Thermal Resistance of Nanoscale Contacts	\$665,299
151341	Advanced High Z NanoScintillators	\$530,247
151343	Tailoring Thermal and Electric Transport Properties Through Solid-State Self-Assembly	\$514,121
151344	Understanding and Controlling Low-Temperature Aging of Nanocrystalline Materials	\$782,423
151345	From Neurons to Algorithms	\$497,715
151346	Incremental Learning for Automated Knowledge Capture	\$359,771
151347	A Comprehensive Approach to Decipher Biological Computation to Achieve Next Generation High-performance Exascale Computing	\$532,514
151348	Systems Biology in 3D: Monitoring and Modeling the Dynamics of Francisella tularensis-associated Granuloma Formation	\$521,069
151349	Reverse Engineering the Host-Virus Interaction Using an Artificial Host Cell	\$578,948
151350	Biomimetic Lung Toxicity Screening Platform (bioMIMIC)	\$478,364
151351	Development of Ab Initio Techniques Critical for Future Science-Based Explosives R&D	\$380,611
151352	Metal-Insulator Transition Based Limiters	\$568,995
151353	Thermoelectric Materials: Mechanistic Basis for Predictive Aging Models and Materials Design	\$791,160
151354	Software-Defined Telemetry Using a Programmable Fuzing Radar	\$352,915
151355	Non-destructive Gas Pressure Measurements in Neutron Tubes and Generators	\$363,888
151356	All Optical Fiber Architecture for Direct Optical Ignition	\$481,735
151357	MEMS Photoacoustic Spectroscopy	\$504,027
151358	AF&F Fail Safe Feature for Abnormal Thermal Environments Using Shape Memory Alloys	\$487,659
151359	New Composite Separator Pellet to Increase Power Density And Reduce Size Of Thermal Batteries	\$497,755

151360	Multi-Phase Laminates: A Study of Prompt Transformations in Abnormal Environments	\$479,730
151361	Liquid Metal Environment Sensing Devices (ESDs)	\$416,280
151362	Low Energy Electron-Photon Transport	\$341,622
151363	Modeling Electron Transport in the Presence of Electric and Magnetic Fields	\$393,151
151364	Mesoscale Modeling of Dynamic Loading of Heterogeneous Materials	\$431,503
151365	Dynamic Temperature Measurements with Embedded Optical Sensors	\$400,794
151366	Spectral Line-Broadening in White Dwarf Photospheres	\$302,082
151367	Z-Petawatt Driven Ion Beam Radiography Development	\$276,200
151368	Descriptions and Comparisons of Brain Microvasculature via Random Graph Models	\$52,562
151369	Development of Novel Nanoarchitectures to Enhance High-Temperature Thermoelectric Oxides for Clean Energy Harvesting	\$26,281
151370	Reconstruction of a High-Resolution Late Holocene Arctic Paleoclimate Record from Colville River Delta Sediments	\$23,327
151373	Discriminative Feature-Rich Models for Syntax-Based Machine Translation	\$53,385
151374	Relational Decision Making	\$53,916
151375	CVD Encapsulation of Mammalian Cells for Hazardous Agent Detection	\$47,182
151377	Fundamental Investigation of CVD Graphene Synthesis	\$47,014
151378	Probing Surface Phenomena in Elevated-Temperature Energy Materials Under Realistic Conditions	\$232,058
151379	In Vitro Construction of Complex Random Peptide Libraries Displayed on Virus-Like Particles for Use in Rapid Response to Emerging Pathogens and Biowarfare Agents	\$259,542
151382	Thermal Transport Properties of Nanostructured Materials for Energy Conversion	\$59,977
151383	On Strongly Coupled Partitioned Schemes for Solving Fluid-Structure Interaction Problems Using High Order Finite Element Models Based on Minimization Principles	\$22,815
151411	Optimizing Infrastructure Investments in a Competitive Environment	\$200,620
152501	AQUARIUS: Adiabatic Quantum Architectures in Ultracold Systems	\$6,057,779
152502	Novel Failure Analysis Technique for Defect or Precursor Detection	\$249,884

152503	Enabling Secure, Scalable Microgrids with High Penetration Renewables	\$3,687,612
152504	Epsilon Near Zero Material for Electromagnetic Energy Transport Through Sub-wavelength Channels	\$251,151
152505	High-Mobility 2D Hole Systems for Quantum Computing Applications	\$153,428
152506	Imaging and Quantification of Hydrogen Isotope Trapping in Stainless Steels	\$227,298
152507	Modeling Reactive Transport in Deformable Porous Media Using the Theory of Interacting Continua	\$59,368
153236	Formation of Algae Growth and Lipid Production Constitutive Relations for Improved Algae Modeling	\$183,867
153342	Automated Exploration of the Mechanism of Elementary Reactions	\$229,334
153346	Nanofabrication of Tunable Nanowire Lasers via Electron and Ion-Beam Based Techniques	\$251,802
153887	Analysis of Gas-Lubricated Foil Thrust Bearings in Supercritical CO <sub>2</sub> Flow	\$257,225
153889	Compact Reactor for Biofuel Synthesis	\$245,957
153890	Multi-Physics Modeling of Environmentally-Activated Network Polymers	\$287,743
153891	Supervised Reconstruction and Recognition for Nonlinear Corruption	\$198,580
153892	Time-Resolved Chemical Mapping of Phase Transformations in Li-ion Battery Electrodes	\$246,915
154002	Combinatorial Optimization with Demands	\$242,989
154058	Developing a Multiscale Test Approach for Characterizing NW Polymer Composites	\$242,734
154059	Improved Performance and Robustness of Scalable Quantum Computing	\$267,423
154060	New Strategies for Pulsed Power Transmission Lines: From Repetitive to Replaceable to Recyclable	\$714,889
154081	On-Chip Low Power Frequency Comb with Spectral Selectivity	\$250,938
154195	On-Chip Coherent Qubit Operations with Microfabricated Surface Ion Traps	\$240,696
154197	Hybrid Methods for Cyber Security Analysis	\$562,788
154198	Investigate the Effectiveness of Many-core Network Processors for High Performance Cyber Protection Systems	\$343,777
154199	Leveraging Complexity for Unpredictable yet Robust Cyber Systems	\$447,148
154200	Massive-scale Graph Analysis on Advanced Many-core Architectures	\$442,997

154259	Thin Magnetic Conductor Substrate for Placement-Immune, Electrically Small Antennas	\$249,052
154273	Beam-Enhanced Electrical 'Fingerprinting' of Complex Integrated Circuits	\$288,387
154274	Proactive Defense for Evolving Cyber Threats	\$417,176
154317	A Geometrically Explicit Approach to Adaptive Remeshing for Robust Fracture Evolution Modeling	\$184,502
154319	Development of a Raman Spectroscopy Technique to Detect Alternate Transportation Fuel Hydrocarbon Intermediates in Complex Combustion Environments	\$201,515
154320	Simplifying Virtual Machine Security Through Foundational Introspection Capabilities	\$134,975
154532	Detection of Identifiable Data	\$198,437
154568	Clustered Void Growth in Ductile Metals	\$176,399
154570	Simulation-Based Strategic Analysis of Complex Security Scenarios	\$272,092
154691	Exploring Formal Verification Methodology for FPGA-based Digital Systems	\$256,454
154693	Reliable PUFs for Supply Chain Assurance	\$396,221
154694	Multi-objective Optimization Approach for Multimodal Information Retrieval	\$221,080
154762	A Novel Bi-functional Conducting Polymer Sensor Material	\$256,607
154763	Coaxial Microwave Neutron Interrogation Source	\$226,821
154778	Advanced Cryptographic Applications	\$255,217
154813	Ultrafast Laser Diagnostics to Investigate Initiation Fundamentals in Energetic Materials	\$148,022
154815	Uncertainty Quantification and Substantiation for Machine Learning in the Context of Cyber-Security	\$241,342
154936	Exploring the Development of Large Area Geiger-mode Avalanche Photodiodes	\$226,638
155065	Polymer-MOF Nanocomposites for High Performance Dielectric Materials	\$214,985
155298	Time-Resolved Broadband Cavity-Enhanced Absorption Spectrometry for Chemical Kinetics	\$254,818
155327	Interface-Tracking Hydrodynamic Model for Droplet Electro-coalescence	\$144,671
155408	Leveraging Safety Applications for Global Revocation and Congestion Control in Vehicular ad hoc Networks	\$223,172
155409	Ion-Induced Secondary Electron Emission and Vacuum Surface Flashover for High Gradient Ion Beam Accelerators	\$207,185
155458	Integration of MHD Load Models With Detailed Circuit Representations of Pulsed Power Drivers	\$138,427



155550	Accelerating the Development of Transparent Graphene Electrodes through Basic Science Driven Chemical Functionalization	\$239,299
155551	Automated Generation of Spatially Varying Stochastic Expansions for Embedded Uncertainty Quantification	\$183,055
155553	Electrokinetic Measurements of Surfaces	\$63,253
155554	Hybrid Optics for Broadband Optical Systems	\$253,338
155797	Solar Fuel Cell for Photocatalysis of Organic Pollutants with Simultaneous H <sub>2</sub> Production	\$248,514
155798	Softening Behavior of Post-Damage Quasi-Brittle Porous Materials	\$221,826
155799	Identifying Dynamic Patterns in Network Traffic to Predict and Mitigate Cyberattacks	\$185,016
155802	Alternative Waveforms for New Capabilities in Radar Systems	\$219,657
155804	Aerosol Characterization Study Using Multi-Spectrum Remote Sensing Measurement Techniques	\$269,778
156135	Use of Limited Data to Construct Bayesian Networks for Probabilistic Risk Assessment	\$209,752
156137	Improving Shallow Tunnel Detection from Surface Seismic Methods	\$244,803
156138	Dynamics of Point Source Signal Detection on Infrared Focal Plane Arrays	\$247,231
156158	New Methods Of Uncertainty Quantification for Mixed Discrete-Continuous Variable Models	\$204,765
156250	Assessing Vulnerabilities of Reconfigurable Logic RF Systems	\$220,067
156251	Developing Highly Scalable Fluid Solvers for Enabling Multiphysics Simulation	\$216,298
156252	Richtmyer-Meshkov Instabilities in Cylindrical and Planar Geometries on Z	\$187,866
156400	Characterization of Atmospheric Ionization Techniques for the Identification of New Chemical Signatures from Home-made Explosives in Complex Matrices	\$258,537
156435	Peering Through the Haze: Privacy and Monitoring in the Cloud Computing Paradigm	\$214,641
156436	Secure and Efficient Privacy Preserving Program Obfuscation with Oblivious RAM	\$266,267
156702	Smart Adaptive Wind Turbines and Smart Adaptive Wind Farms	\$255,251
156703	Simulation of Primary Fuel Atomization Processes at Subcritical Pressures	\$216,296
156704	Determination of Reaction Zone Length in Vapor-deposited Explosive Films	\$253,227

157145	Fluid Flow Measurement of High Temperature Molten Nitrate Salts	\$249,978
157168	Advanced Malware Analytics	\$162,606
157310	Optical Refrigeration in Semiconductors for Next Generation Cryocooling	\$250,287
157311	Hydrological Characterization of Karst Phenomenon in a Semi-Arid Region using In-situ Geophysical Technologies	\$187,965
157633	Silicon Photonics for Ultra-Linear RF Photonic Devices and Links	\$252,749
157688	Multilevel Summation Methods for Efficient Evaluation of Long-Range Pairwise Interactions in Atomistic and Coarse-Grained Molecular Simulation	\$207,576
157690	Luminescent Lanthanide Reporters for High-Sensitivity Novel Bioassays	\$192,473
157693	Kinetics of Radiation-Driven Phase Transformations in PZT Ceramics	\$214,480
157694	Beyond the Ideal Nanostructure: Local Environmental Effects on the Electronic and Optical Properties of Carbon Nanotubes	\$232,807
157910	Authorship Attribution for Natural Language Text and Software	\$195,747
157957	Predicting the Future Trajectory of Arctic Sea Ice: Reducing Uncertainty in High-Resolution Sea Ice Models	\$211,418
158181	Micro-scale Heat Exchangers for Cryogenic Micro-cooling Applications	\$146,525
158182	High Performance Graphics Processor based Computed Tomography Reconstruction Algorithms for Nuclear and Other Large Scale Applications	\$238,126
158183	Gas Permeation Properties of Graphene Membranes	\$250,383
158184	New Thin Film Materials for Electronics	\$51,938
158185	Pathogenicity Island Mobility and Gene Content	\$263,053
158186	Production of Extremophilic Bacterial Cellulase Enzymes in <i>Aspergillus Niger</i>	\$217,517
158410	Intra-membrane Molecular Interactions of K <sup>+</sup> Channel Proteins: Application to Problems in Biodefense and Bioenergy	\$250,186
158477	Sublinear Algorithms for Massive Data Sets	\$259,882
158478	Functional and Robust Asymmetric Polymer Vesicles	\$247,461
158479	Instrumenting Nation-Scale Networks with Hierarchical, Peer-to-Peer Communications	\$276,325
158481	Cubic Organic Scintillators as Improved Materials for Fast Neutron Detection	\$236,709
158482	Accurate Model Development for Large Eddy Simulation of Turbulent Compressible Flow Problems	\$161,402

158518	Integrated Auto-catalytic Composite Strategies	\$52,829
158698	A High Voltage, High Current Thyristor Stack Command Triggered by dV/dt - An Improved MOS-Controlled Thyristor-like Nanosecond Closing Switch	\$259,391
158699	Atomistic Modeling of Memristive Switching Mechanisms in Transition Metal Oxides	\$230,875
158700	Explosives Detection with Neutrons from a Short Pulse High Intensity Neutron Source	\$253,599
158701	Laser-Ablated Active Doping Technique for Visible Spectroscopy Measurements on Z	\$199,365
158702	Surface Electrochemistry of Perovskite Fuel-cell Cathodes Understood In-Operando	\$246,066
158740	Memristor Evaluation and Optimization for Cyber Security	\$277,184
158741	Chip Scale Extremely High Data Rate Encryption Architecture Utilizing Novel Silicon Photonics Optical Interconnects	\$324,686
158742	A Thin Hypervisor for Dynamic Analysis and Reverse Engineering of ARM Based Embedded Systems	\$421,728
158743	Encryption using Electrochemical Keys (EEK)	\$436,222
158744	Leveraging Formal Methods and Fuzzing to Verify Security and Reliability Properties of Large-Scale High-Consequence Systems	\$298,770
158745	Running Malware on Millions of Android Cell Phones	\$266,231
158746	Geographically Distributed Graph Algorithms	\$222,357
158747	An Adaptive Web Spider for Multi-Modal Data	\$225,039
158748	Vulnerability Analysis of LTE-Capable Devices	\$340,209
158749	System Level Cyber Analysis of Cellular Network Infrastructure	\$289,178
158750	An Approach to Predicting the Performance of Advanced Concretes Using Peridynamic Theory	\$110,851
158751	Assessment of Windows Integrity Levels for Sandboxed Systems	\$312,845
158752	PLC Backplane Analyzer for Field Forensics and Intrusion Detection	\$263,916
158753	SAR and Multispectral SWaP Reduction via Compressive Sensing	\$211,424
158754	2-color nBn FPA	\$656,393
158755	Advanced Imaging Optics Utilizing Wavefront Coding	\$286,028
158756	Nanoantenna Enabled Focal Plane Array	\$648,128
158757	Applying Discrimination Methods to Collected and Synthetically Modeled Explosive Signatures	\$371,986
158758	Acoustic Detector for Fission Neutrons	\$221,224
158759	Remote Optical Sensing of Ionizing Radiation	\$284,994

158760	Cueing for Change Detection Via Geospatial-Temporal Semantic Graphs	\$202,859
158764	Training Adaptive Decision Making	\$324,824
158765	A Complexity Science-Based Framework for Global Joint Operations Analysis to Support Force Projection	\$549,892
158766	Validating Agent Based Models Through Virtual Worlds	\$350,238
158767	Quantitative Adaptation Analytics for Assessing Dynamic Systems of Systems	\$465,370
158768	Ultra-Stable Oscillators for RF Systems	\$300,948
158769	Differential Emitter Geolocation	\$102,511
158770	Moving Target Detection and Location in Terrain Using Radar	\$554,965
158772	Acoustic Tag for Maritime Location and Tracking Applications	\$194,610
158773	Electronic Battle Damage Assessment (eBDA)	\$548,000
158774	Ablation Chemistry Effects on Boundary-Layer Transition	\$476,641
158775	Developing Deeply Integrated GPS/INS Navigation System for High Dynamic Applications	\$247,069
158776	Structural Kinetic Energy Warhead for Scaled and Multi-Platform Applications	\$264,494
158777	Borazine-Based Structural Materials	\$293,424
158778	Unique Strategies for Radio Frequency Detection	\$125,374
158779	Novel Memory Analyses	\$144,753
158780	Inferring Organizational Structure from Behavior	\$315,258
158781	Breaking the Language Barrier	\$162,896
158782	Frequency Translation to Demonstrate a 'Hybrid' Quantum Architecture	\$449,875
158783	Cross-Domain Situational Awareness in Computing Networks	\$393,749
158784	Non-linear Decision Theory Applied to Co-Hosting Analysis for National Security Space Payloads	\$63,075
158785	Learning From Nature: Biomimetic Polarimetry for Imaging in Obscuring Environments	\$44,594
158786	Parallel Object-Oriented Programming of FPGAs and CPUs	\$46,139
158787	Scheduling Irregular Algorithms	\$50,498
158789	Breaking Computational Barriers: Real-time Analysis and Optimization with Large-scale Nonlinear Models via Model Reduction	\$257,676
158792	Exploring Heterogeneous Multicore Architectures for Advanced Embedded Uncertainty Quantification	\$401,219
158793	Architecture- and Resource-Aware Partitioning and Mapping for Dynamic Applications	\$540,779

158794	Automated Algorithms for Achieving Quantum-level Accuracy in Atomistic Simulations	\$656,777
158795	Electromagnetic Extended Finite Elements for High-Fidelity Multimaterial Problems	\$338,181
158801	Ultrafast Laser Diagnostics for Energetic-Material Ignition Mechanisms: Tools for Physics-Based Model Development	\$714,647
158802	Fault Survivability of Lightweight Operating Systems for Exascale	\$586,050
158803	Effect of Varying Convection on Dendrite Morphology and Macrosegregation	\$29,392
158804	Next-Generation Algorithms for Assessing Infrastructure Vulnerability and Optimizing System Resilience	\$29,135
158805	Next Generation Suspension Dynamics Algorithms	\$42,047
158806	Multi-scale Modeling of Brittle Heterogeneous Materials	\$78,284
158808	Advanced Materials for Next-Generation High-Efficiency Thermochemistry	\$1,021,222
158809	Designing Greenhouse Gas Monitoring Systems and Reducing Their Uncertainties	\$704,268
158810	The Science of Battery Degradation	\$945,465
158811	Optimization of Distributed Waste Water/Water Reuse Systems	\$30,674
158813	Development of a Sustainable Anthrax Diagnostic Test for Countering the Biological Threat	\$482,056
158814	Advance Diagnostic and Sample Preparation Platform for Early Threat Surveillance	\$581,346
158816	Development of a Statistically Based Access Delay Timeline Methodology	\$325,103
158819	Multi-Target Camera Tracking, Hand-off and Display	\$431,572
158820	Rapid Affinity Reagent Development for Emerging Pathogen Detection	\$292,256
158821	Intrinsic Material Elements Seal	\$444,995
158822	In-situ Study of Dynamic Phenomena at Metal Nanosolder Interfaces Using Aberration-Corrected Scanning Transmission Electron Microscopy	\$556,935
158823	Deciphering Adsorption Structure on Insulators at the Atomic Scale	\$359,577
158825	Crystalline Nanoporous Frameworks: a Nanolaboratory for Probing Excitonic Device Concepts	\$513,803
158826	Electrically Tunable Metamaterials for Agile Filtering in the Infrared	\$587,038
158828	Understanding Tantalum Oxide Memristors: An Atoms Up Approach	\$683,591

158829	Understanding and Exploiting Bilayer Graphene for Electronics and Optoelectronics	\$715,543
158830	GaN Unipolar Optical Modulators	\$583,753
158832	Mechanism of Fusion of Pathogenic Enveloped Viruses with the Endosomal Membrane	\$537,675
158834	Identification of Host Response Signatures in Mouse Models of Crimean-Congo Hemorrhagic Fever Virus Infection	\$224,995
158835	Utilizing Biocomplexity to Propagate Stable Algal Blooms in Open System ? Keeping the Bloom Going	\$736,047
158836	Using High Performance Computing to Examine the Processes of Neurogenesis Underlying Pattern Separation/Completion of Episodic Information	\$320,557
158847	A Novel Nanobiotechnological Approach for Controlling and Enhancing Cognitive Function	\$153,162
158849	Identification and Display of CRLF2 Ligands for Targeted Nanoparticle Delivery to Actue Lymphoblastic Leukemia	\$42,050
158850	Miniature Tritium Free Neutron Generator	\$594,025
158853	Chemical Enhancement of Surface Kinetics in Hydrogen Storage Materials	\$473,321
158854	Advances in High Dynamic Range Resonant Accelerometers	\$350,792
158855	Impact of Crystallization on Glass-ceramic to Metal Bonding	\$415,866
158856	Synthesis of Wear-Resistant Electrical Contact Materials by Physical Vapor Deposition	\$513,453
158857	Extension of Semiconductor Laser Diodes to New Wavelengths for Novel Applications	\$673,012
158858	Fundamental Studies on Initiation and Evolution of Multi Channel Discharges and their Application to Next Generation Pulsed Power Machines	\$645,092
158859	New Radiation-Resistant Materials	\$438,626
158860	A New Capability to Model Defects in InGaAs and InGaP Alloys	\$367,518
158861	Investigate Emerging Material Technologies for the Development of Next Generation Magnetic Core Inductors for LTD Pulsed Power Drivers	\$301,083
158997	Heterogeneous Scalable Framework for Multiphase Flows	\$240,794
158998	Nuclear Fuel Cycle System Simulation Tool Based on High-Fidelity Component Modeling	\$249,877
158999	Development of a System Model for a Small Modular Reactor Operating with a S-CO2 Cycle on a DoD Installation that Utilizes a Smart/Micro-Grid	\$247,663

159005	Interaction-driven Learning Approaches to Complex Systems Modeling	\$250,946
159006	Transactions for Resilience and Consistency in Integrated Application Workflows for High Performance Computing	\$255,471
159054	Solution Methods for Network-based Scheduling Problems	\$28,059
159056	Intrinsically Radiation-Hard Nonvolatile Memory: SnO <sub>2</sub> Memristor Arrays	\$87,433
159167	Measuring the Microscopic Mechanics of Individual Intermolecular Systems	\$308,197
159184	Coupling of Quantum Dots to Nanoplasmonic Structures	\$59,481
159185	Calculation of Nucleation Pathways in Membrane Systems	\$65,322
159214	Activity Based Intelligence, Data to Decisions	\$474,314
159256	Applications of Microwave Frequency Nano-Optomechanical Systems: Oscillators, Circuits, and Sensors	\$325,297
159257	Science-enabled Next Generation Photovoltaics for Disruptive Advances in Solar Power and Global Energy Safety and Security	\$3,516,022
159258	Extreme Scale Computing Grand Challenge	\$3,550,425
159259	Toward a Predictive Understanding of Low Emission Fuel-Flexible Distributed Energy Turbine Systems	\$53,383
159299	Using a Nonlinear Crystal to Optically Measure Pulsed Electric Fields in Radiation Environments	\$175,057
159300	Superconductive Silicon Nanowires Using Gallium Beam Lithography	\$196,564
159302	Opportunities for Waste and Energy	\$220,219
159303	Modeling and Development of Non-Destructive Forensic Techniques for Manufacturer Attribution	\$245,544
159304	Enhanced Methods for the Compression of SAR Video Products	\$214,751
159305	Analysis of Defect Clustering in Semiconductors using Kinetic Monte Carlo Methods	\$155,966
159749	Deciphering the Role of Residual Stresses on the Strength of Adhesive Joints	\$200,451
160400	Enhancing National Security to Rare Earth Element Shortages through Uncertainty Analysis	\$249,656
161139	Monte Carlo Processor Modeling	\$94,631
161633	Nitrous Oxide-Hypergol Propellants	\$45,595
161862	Inherent Secure Communication Using Lattice Based Waveform Design	\$165,999

161863	Optimal Adaptive Control Strategies for Hypersonic Vehicle Applications	\$156,726
161864	Theoretical Foundations for Measuring the Groundwater Age Distribution	\$175,786
161865	A Micro to Macro Approach to Polymer Matrix Composites Damage Modeling	\$143,502
161866	Chloride-Insertion Electrodes for Rechargeable Aluminum Batteries	\$123,154
161867	Digital Holography for Quantification of Fragment Size and Velocity from High Weber Number Impacts	\$200,369
161868	Hybrid-renewable Processes for Biofuels Production: Concentrated Solar Pyrolysis of Biomass Residues	\$189,878
161869	Modeling the Contents of Nuclear Weapons in Real-Time	\$37,108
161870	Compressive Sensing for Nuclear Security Applications	\$183,945
161871	A Cognitive and Economic Decision Theory for Examining Cyber Defense Strategies	\$167,954
161873	Aerosol Aging Processes and their Relevance to Human and Environmental Hazards	\$179,340
162034	Genomic Functionalization: The Next Revolution In Biology	\$184,866
162035	Computational Optimization of Synthetic Water Channels	\$89,354
162036	Two Dimensional Coupling of Modes Modeling for Spurious Response Prediction in Microresonators	\$55,006
162299	Integrating of SD and PRA to Create a Time-Dependent Prediction of the Risk Profile of a Nuclear Power Plant	\$149,321
162522	Impact of Materials Processing on Microstructural Evolution and Hydrogen Isotope Storage Properties of Pd-Rh Alloy Powders	\$38,909
162907	Temperature Dependence of the Electronic and Optoelectronic Properties of Carbon Nanotube Devices	\$74,882
162908	Using Temporal Analysis for Robust Deception Detection	\$148,713
164183	Defect Localization, Characterization and Acceleration Factor Assessment in Emerging Photovoltaic and Power Electronic Materials	\$70,492
164661	Developing Software Systems for High-Assurance Applications	\$84,731
164662	Self-Deconstructing Algal Biomass as Feedstock for Transportation Fuels	\$76,024
164667	Heavy Duty Vehicle and Infrastructure Futures	\$79,935
164668	Advanced Diagnostics for High Pressure Spray Combustion	\$91,288
164670	Athermal Spectro-Polarimetric ENhancement (ASPEN)	\$36,117



164671	Investigating Dynamic Hardware and Software Checking Techniques to Enhance Trusted Computing	\$81,432
164672	Nano-Structured Silicon Phononic Crystals with Metal Inclusions for ZT Enhancement Proof-of-Concept	\$95,906
164676	Gate-Controlled Diode Structure to Investigate Leakage Current and Early Breakdown in Graded InGaAsP/InP Junctions	\$71,882
164677	Alloys and Composites for Strong and Tough Freeform Nanomaterials	\$79,873
164678	Reduced Order Modeling for Prediction and Control of Large-Scale Systems	\$69,131
164759	Time-Dependent Resistivity of Millimeter-Gap Magnetically Insulated Transmission Lines Operated at Megampere/Centimeter Current Densities	\$71,758
164764	An Empirical Assessment of the Factors Underlying Phishing	\$77,921
164867	Machine-Oriented Biometrics and Cocooning for Dynamic Network Defense	\$242,438
164869	Flexible and Scalable Data Fusion using Proactive, Schemaless Information Services	\$63,671
164892	Mission Capability Analysis Environment for End-to-End Performance Assessment of Space Systems	\$52,762
164894	Training Cyber Situation Awareness in Blue Team Exercises	\$187,131
165464	Nanoscale Piezoelectric Effect Induced Surface Electrochemical Catalysis in Aqueous Environment	\$55,713
<b>Total # of Projects for SNL: 433</b>		
<b>Total Cost for SNL: \$162,288,117</b>		
<b>Total Administrative Cost \$2,961,183</b>		
<b>SRNL - Savannah River National Lab</b>		
LDRD-2012-00016	Implementation and Testing of SKPM-based Photo-induced Charge Spectroscopy Method for Measuring Energy and Lifetimes of Stored Charge in Organic Thin Film Systems	\$240,628
LDRD-2012-00021	Characterization of chemical changes observed for uranium and plutonium particulate materials	\$356,636
LDRD-2012-00029	Tunable Hydrophobic/philic Reaction Sites on Multifunctional Catalysts for the Redox of Lithium for Improved Energy Storage	\$307,607
LDRD-2012-00030	15 MW Hardware-in-the-Loop Grid Simulation	\$363,635
LDRD-2012-00036	Removal of Aqueous 99Tc, 129I, and 137Cs Using Reactive, Low-Cost Materials	\$291,453

LDRD-2012-00038	Non-Aqueous Electrochemical Fluorination of Used Nuclear Fuel as an Advanced Separation Process	\$532,722
LDRD-2012-00053	Application of Cooling Towers for Collection, Concentration, and Detection of Chemical and Radiological Agents	\$251,215
LDRD-2012-00066	Redox Catalyst Development for Improving Electrolytic Cells	\$256,335
LDRD-2012-00069	New Materials for Hybrid Lithium-Ion Battery	\$210,225
LDRD-2012-00072	Novel Materials for Actinide Separations	\$248,007
LDRD-2012-00077	Evaluation of Hydrogen Isotope Exchange Methodology on Adsorbents for Tritium Removal	\$236,203
LDRD-2012-00081	Sensor Development for In-situ Non-interrupted Chemical Speciation for Structural Health Monitoring and Functional Release Detection of Radionuclides	\$442,546
LDRD-2012-00084	Smart Nanophase Extractors for Environmental Remediation and Liquid Waste Clean-up	\$213,169
LDRD-2012-00091	High Rare Earth Halide Containing Scintillating Glasses for Gamma Ray Detection	\$24,374
LDRD-2012-00099	GrayQb	\$106,819
LDRD-2012-00101	Construction of High Performance Infrared Absorption Gas Sensor	\$63,516
LDRD-2012-00102	Novel Concepts for Isotopic Separation of He3/He4	\$48,122
LDRD-2012-00104	Alignment of Nano-rods into Coherent Structures Using Evanescent Electric Fields	\$77,719
LDRD-SI-2011-001	Reactive Gas Reprocessing of Spent Nuclear Fuel	\$502,820
LDRD-SI-2011-003	Risk Reduction and Process Optimization for Engineered Algae Production Systems	\$438,383
LDRD-SI-2011-004	Nano-Photocatalysts for Solar Fuels Applications: Conversion of CO2 to Hydrocarbons	\$513,205
LDRD-SI-FY09/10-015	Development of High Capacity Portable Power Systems	\$743
LDRD-SI-FY09/10-023	Advanced Batteries for Electric Energy Storage	\$25,487
LDRD-SI-FY09/10-033	The Use of Statistical Downscaling to Project Regional Climate Changes as They Relate to Future Energy Production	\$90
LDRD-ST-2011-002	Effects of Hemicellulose Removal on Delignification and Hydrolysis of Lignocellulosic Materials	\$208
LDRD-ST-2011-011	Investigation of the Mechanisms Governing Charge Transport & Storage in Organic Semiconducting Materials Toward New Devices	\$692
LDRD-ST-2011-015	Carbon Nanomaterials with Encapsulated Gadolinium for Advanced Neutron Detection	\$160
LDRD-ST-2011-020	Organic-based Ionic Salts for Optimization of Alkaline Fuel Cells	\$19

LDRD-ST-2011-021	Ionogels as Solid Electrolytes for Advanced Battery Application	\$1,622
LDRD-ST-2011-024	High Performance Nanofluidic Sensors for Detecting Chemical and Biological Agents in Deterrence of Terrorist Attacks	\$535
<b>Total # of Projects for SRNL: 30</b>		
<b>Total Cost for SRNL: \$5,754,895</b>		
<b>Total Administrative Cost \$160,366</b>		
<b>SRP - Savannah River Plant</b>		
SR09001	Reusable nano-iron beds for tritium recovery-an alternative to magnesium beds	\$1,461
SR09020	Low-voltage tritium detection based on gas nano-proportional counters	\$11,391
SR09034	Evaluate Pt-based catalysts for tritium oxidation reaction	\$98,944
SR09041	Cavity enhanced absorbance gas cells for use in trace gas optical detection	\$10,045
SR11001	Mini-TCAP (Thermal Cycling Absorption Process)	\$1,329,932
SR11002	Hydride Bed Thermally Enhanced Cartridge Heated Modification (TECH-Mod)	\$369,789
SR11003	Thermal Energy Application to Reliably and Safely Self-Power Systems and Processes	\$130,433
SR12011	Laser Ablation for Tritium Removal (LATR)	\$1,011
SR12022	Tritium Sensor Technology Development Roadmap and Tritium Instrument Demonstration Station	\$253,331
SR12025	Alternative to Monthly Source Checking of Facility Electrometers	\$4,728
<b>Total # of Projects for SRP: 10</b>		
<b>Total Cost for SRP: \$2,211,065</b>		
<b>Total Administrative Cost \$161,638</b>		
<b>Y-12 - Y-12 Plant</b>		
PD100108	Amorphous Metal Wire Sensor	\$254,993
PD100234	Crimp Weld Process Improvement	\$169,390
PD100242	Dimensional Metrology Process Improvements	\$77,645
PD100268	Development of NDE Raman Capabilities	\$521,570
PD100280	IIS Controller Replacement	\$288,723
PD100281	Real-Time Analysis of Uranium Welding	\$141,333
PD100290	Advanced Digital Radiography	\$467,829
PD100294	Process Measurements	\$143,499
PD100298	Deformation Behavior and Microstructure of as-cast DU	\$306,974
PD100303	CMM Research Equipment	\$690,702

PD100307	Nondestructive Assay of Uranium Oxides in Storage Columns	\$185,291
PD100312	Heavy Water Production	\$174,332
PD100313	Uranium Separation Technologies	\$246,686
PD100315	Mixing Tank Evaluation	\$195,508
PD100323	Advanced Disassembly Processes for Material Recovery and Reuse	\$291,097
PD100324	Precision Hydroforming	\$87,435
PD100335	Tin Whisker Mitigation In Lead Free Systems	\$141,897
PD100482	UNH Calcination Optimization	\$343,235
PD110221	Advanced Integrated Machining System (AIMS) Prototype	\$879,895
PD110516	Direct Electrolytic Reduction and Electrorefining of Uranium (DER/ER)	\$3,362,116
PD110661	Reduced Exposure Manufacturing Operations Technologies (REMOTE)	\$753,878
PD110668	Direct Manufacturing Evaluation	\$212,712
PD110669	Wireless Sensor Network for Production Applications	\$386,589
PD110670	Measurements and Standards for the NDSTC	\$339,670
PD110684	Spark Source Time-of-Flight Mass Spectrometry	\$302,525
PD110718	Diskless - Wireless Production Prototype	\$231,676
PD110720	Compatibility Testing and Center for Advanced Nuclear Fuels	\$372,119
PD110738	Enhanced Alloy Processing in MW castings	\$322,445
PD110755	Small Scale Lithium Wet Chemistry	\$573,753
PD110776	Dimensional Metrology new technology evaluation	\$45,585
PD110794	Standoff Detection Feasibility Study	\$151,524
PD110804	Surface Repair of Casting Defects	\$63,743
PD110813	Secure Wireless Voice Over Internet Protocol Technology for Production Use	\$128,239
PD110839	Methods of making U-Mo powder	\$849,921
PD110843	Demonstration of Special Material Production Flowsheet	\$88,446
PD110864	Janus Spindle Evaluation	\$398,582
PD110907	FI&S Maintenance Management	\$204,612
PD110909	Video-based detection for UPF	\$237,758
PD110953	Special Casting Simplification and NCS Enhancement	\$348,236
PD110974	Alternative Uranium Compound Synthesis	\$315,819
PD111210	Schaaff Technical Fellowship - Enhancing Nuclear Forensics Capabilities	\$211,174
PD121330	Induction Brazing Application	\$85,570
PD121331	Brush Electropolish Evaluation	\$40,412
PD121346	High Accuracy/Precision 235U Enrichment Verification Station for LEU Alloys	\$387,749

PD121356	Reduced carbon levels on uranium chips	\$178,750
PD121360	Outdoor Wireless Mesh Networking For UPF Construction	\$130,203
PD121365	Improvement of Plant Metal Quality	\$325,691
PD121369	Enriched Uranium Concentration Measurements	\$729,956
PD121376	Continued Development and Fielding of Ultra-Wide Band Technologies at Y-12	\$195,725
PD121389	Multi-Material Experimental Corrosion Study	\$154,459
PD121390	Debondable Adhesives	\$171,314
PD121392	Chip Cleaning Optimization Studies	\$139,750
PD121393	Direct Material Manufacturing Process Improvement Studies	\$170,469
PD121394	Radiological NMR Studies	\$306,088
PD121396	Semiconductor Radiation Detectors	\$200,282
PD121404	Special Material Purification Parameter Study	\$581,985
PD121405	New Explosives Sensors Based on Magnetic Wires and Molecular Recognition Phases	\$267,467
PD121407	Negative Glovebox - Proof of Principle	\$474,661
PD121408	Special Material Characterization and Recovery	\$68,421
PD121409	Thermal Decomposition & Distillation	\$588,282
PD121412	Low Concentration Uranium Measurements in the Presence of Radioactive Impurities	\$291,914
PD121427	Metallographic Process Development	\$470,193
PD121428	Optimization of BP thin film detector	\$159,178
PD121429	OCF Dock Scrubber Efficiency	\$31,872
PD121435	Neutron Scattering Studies of Aging Effects in Y-12 Materials	\$339,650
PD121436	Density Evaluation by Gas Pycnometry	\$118,988
PD121468	Uranium Detection in Molten Salts Using Cyclic Voltammetry	\$193,201
PD121470	System Health Monitoring for Production Facilities	\$232,057
PD121485	Fast Region of Interest Weld Evaluation	\$230,489
PD121492	Advanced Modeling and Simulation for System Optimization	\$382,537
PD121523	Predictive Human Resource Model	\$176,571
PD121559	Part Manipulator for Digital Radiography Positioning	\$178,548
PD121563	Calibration of Standard Leaks using the Rate-of-Rise method	\$243,089
PD121600	Nuclear/Radiological Safeguards and Physical Security Initiatives Program	\$39,508
PD121638	Fabrication of High Density Monolithic Uranium Targets for Mo-99 Production	\$73,779
PD121870	U-Mo Coupon Surfacing Techniques	\$24,023
<b>Total # of Projects for Y-12: 76</b>		

<b>Total Cost for Y-12: \$23,891,987</b>	
<b>Total Administrative Cost \$1,701,254</b>	